EXCAVATING ENGINEER

FOUNDED 1905

HIGHWAY FORECAST ISSUE

TRANSPORTATION [illegible]

The Big Ones Come Easy

with

BUCYRUS ERIE

IVE-YARD

120-B

1 ACCURATELY CONTROLLED POWER . . . Ample power under perfect control on each motion, hoist, swing and crowd, gives the 120-B a fast cycle. Torques, speeds and weight placement are scientifically balanced for high-speed digging. Responsive control makes it easy to maintain speed for big output throughout the shift.

2 LOW OPERATING COSTS . . . Balanced design blends operating reactions smoothly, resulting in minimum stress on machine. Every part has an ample safety factor, but modern design avoids excess weight and keeps power consumption at a minimum. With the 120-B you have minimum upkeep and minimum lost time because of time-tested design and Bucyrus-Erie quality construction.

3 EFFICIENT DIGGING ACTION . . . Long effective upper boom section, big sheaves and single-part hoist give a wide angle between line of bail pull and line of backward thrust that means maximum effective digging force at the dipper teeth. Power is applied efficiently to the business of digging throughout the 120-B.

4 BIG OPERATING RANGE . . . The 120-B has long range and high lift that make it possible to handle wide cuts efficiently. This means minimum time spent shifting tracks or shovel, and means efficient loading into modern cars or trucks. Moves, digs, and loads on steep grades; easy to get in and out of cuts.

5 FAST FULL SWING . . . Twin vertical swing units, properly balanced, give smooth action, with quick acceleration and deceleration. Full revolving, the 120-B sets oversize rocks aside easily, loads out slides quickly. With ability to load on either side, it is easy to save time by double spotting on truck haul.

6 COMPLETE MOBILITY . . . The 120-B mounting is rugged and flexible. It is a firm foundation for digging and provides for quick move-ups and fast moves from slides. The 120-B can climb stiff grades, dig in or out of a cut in either direction, go anywhere in the pit in a hurry. Ideal for mixing rock or ore; saves by doubling on loading and stripping operations.

7 EASY CONVERTIBILITY . . . The 120-B can be easily and quickly converted from shovel to dragline, or vice versa, in the field. This increases its potential usefulness, as well as giving it a higher resale value.

Bucyrus-Erie Company

SOUTH MILWAUKEE • WISCONSIN • U. S. A.

EXCAVATING ENGINEER

FOUNDED 1905

contents

Vol. XXXVII January, 1943 No. 1

EXCAVATING ENGINEER ~~Jan 1942~~ 37 1943

Red. Bind adv. 1 issue only.

EXCAVATING ENGINEER

1905

c o n t e n t s

Vol. XXXVII — ——— ', 1943 — No. 1

January Advertisers

American Chain & Cable Company .....3rd Cover
Barber-Greene 8-9
Bethlehem Steel Company 2
Brooks Equipment and Manufacturing Company 54
Buckeye Traction Ditcher Co... 5
Bucyrus-Erie Company...2nd Cover, 10, 42-43, 51, 59, 60
Buda Company, The 35
Cleveland Rock Drill Co., The 7
Ensign-Bickford Company, The. 4
Euclid Road Machinery Co., The .....4th Cover
For Sale (classified) 63-64
Gatke Corporation 57
General Excavator Company, The 49
Haiss Manufacturing Company, Geo. 55
Hayward Company, The 60
Hercules Company, The 49
Hercules Powder Company ... 47
Ingersoll-Rand Company 1
Koehring Company 11
Leschen & Sons Rope Co., A... 53
MacWhyte Company 37
Northwest Engineering Company 33
Osgood Company, The 49
Owen Bucket Company 56
Preformed Wire Rope 29
Rogers Brothers Corporation... 61
Sauerman Brothers 61
Socony-Vacuum Oil Company, Inc. 31
Timken Roller Bearing Co., The 39
U. S. War Savings Bonds 6
Wellman Engineering Co., The.. 62

Front Cover

Oregon's newly constructed U. S. Highway 101 along the shore of the Pacific Ocean is a cameraman's paradise, judging from this view taken at Neahkahnie Mountain.

Highway Forecast for 1943 13

Alabama	14	Iowa	'	Nebraska	50	Rhode Island	56
Arizona	14	Kansas	45	Nevada	50	South Carolina	57
Arkansas	14	Kentucky	45	New Hampshire	50	South Dakota	57
California	14	Louisiana	45	New Jersey	52	Tennessee	57
Colorado	16	Maine	46	New Mexico	53	Texas	57
Connecticut	16	Maryland	46	New York	54	Utah	58
Delaware	17	Massachusetts	48	North Carolina	54	Vermont	58
District of Columbia	17	Michigan	48	North Dakota	55	Virginia	58
Florida	17	Minnesota	49	Ohio	55	Washington	59
Georgia	17	Mississippi	'	Oklahoma	55	West Virginia	60
Idaho	'	Missouri	'	Oregon	56	Wisconsin	60
Illinois	17	Montana	50	Pennsylvania	56	Wyoming	61
Indiana	44						

Preventive Maintenance for Your Electric Excavators— by L. V. Winchester 18

Invest in a small amount of inspection time now, save heartbreaking shutdown time later. That's the moral of this article, and it's worth reading if you own or operate electric excavating equipment.

Developing a Deep Pit Iron Ore Mine 22

North Range Mining Company employs the E. W. Coons organization to open up and operate a 274-foot deep iron ore pit on the Mesabi Range. Here's how they produced 1,325,000 tons of that all-important metal.

How to Increase Your Shovel Output 24

First of a series of articles discussing some of the ways you can do more with your present equipment, and make it last longer at the same time.

Obituary 27

Charles F. Spencer

Shots From the Firing Line 28

Estimated Construction Volume for '43 28
Kaiser Addresses Industrial War Congress 28
State Highway Officials Make 1943 Plans 30
Highway Fund Diversion Reversal Suggested 32
Indiana Road Men Convene 32

Not in the Contract 34

Notes From the Manufacturers 62

New Trade Literature 62

Published Monthly by THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.

F. O. WYSE, *Publisher* — ARNOLD ANDREWS, *Consulting Editor*
D. B. REED, JR., *Managing Editor* — JOHN I. MORAVEC, *Art Director*
M. J. BARGENQUEST, *Editor* — DELMAR COHEN, *Assistant Editor*
E. M. HEUSTON — A. O. THOMPSON

CCA Member Controlled Circulation Audit

Regular subscription: 25 cents per copy, $2.50 a year; Canada, subject to publication policy, $3.50 per year. Special subscription: Upon written request on company letterhead, this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

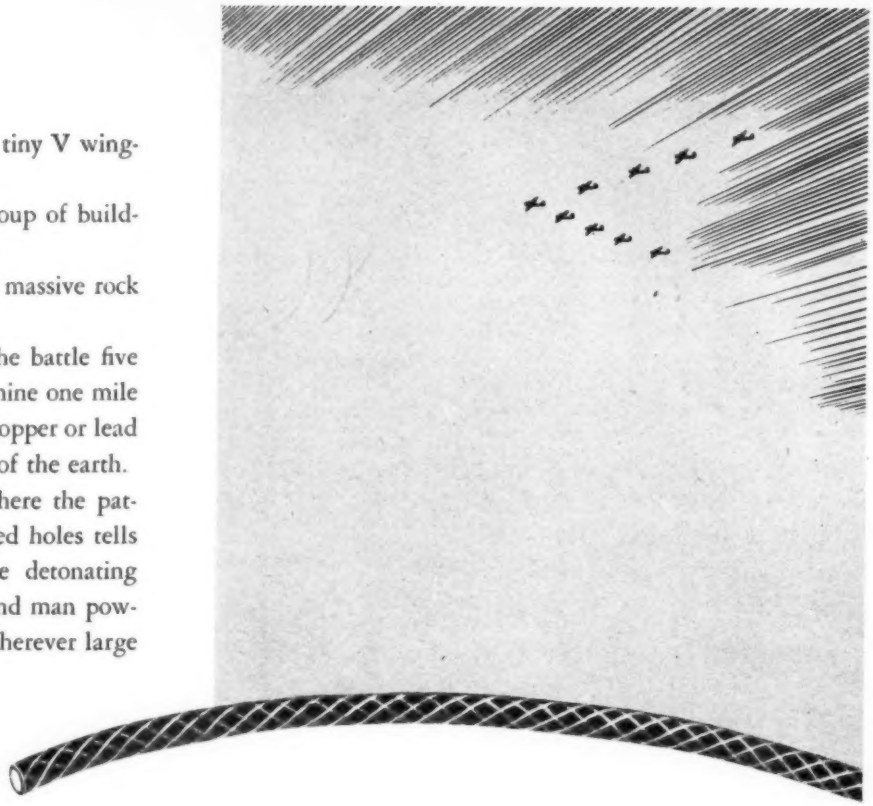
Against the sky . . . a tiny V winging toward the rising sun.

Far below . . . a small group of buildings, nestling in the Valley.

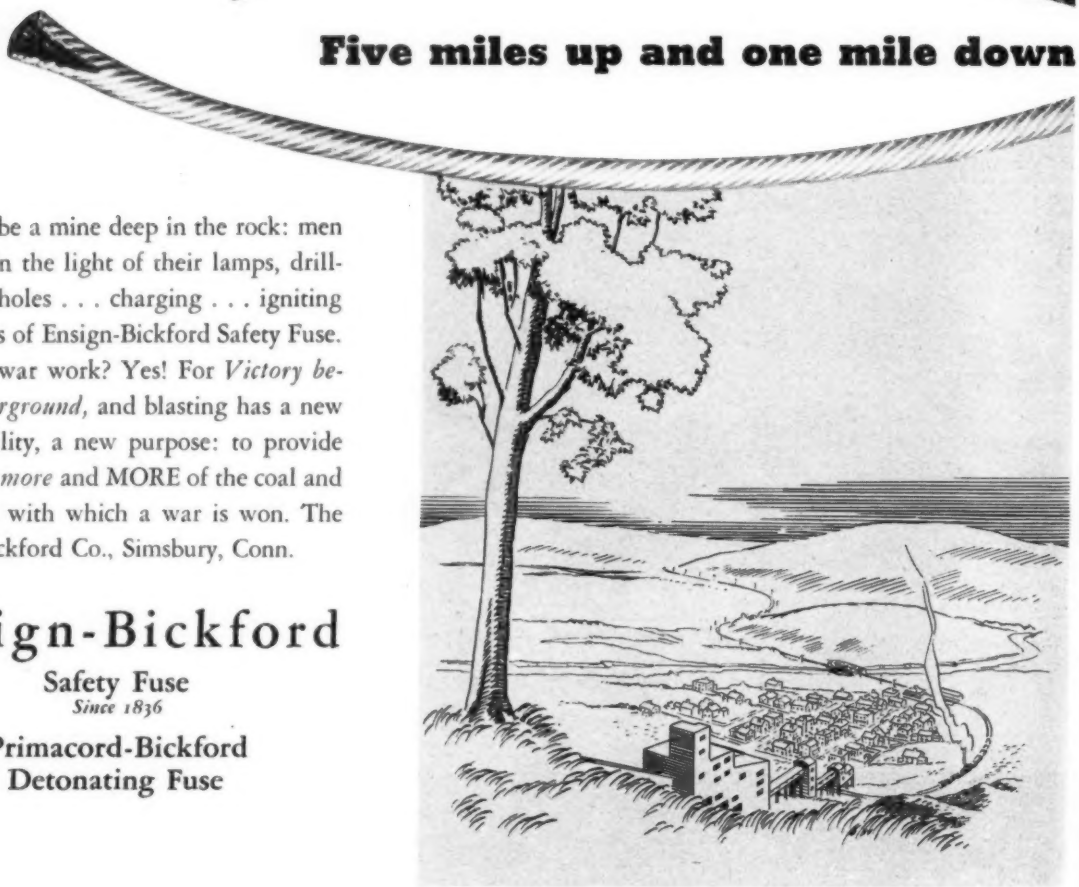
And deeper yet, in Earth's massive rock . . . a mine.

Partners in Victory. For the battle five miles up can be won in the mine one mile down, where coal or iron or copper or lead or silver . . . are blasted out of the earth.

It may be an open pit, where the pattern of smoke from a hundred holes tells the story of Primacord—the detonating fuse that is saving powder and man power—and promoting safety—wherever large blasting is done.



Five miles up and one mile down



It may be a mine deep in the rock: men working in the light of their lamps, drilling blast holes . . . charging . . . igniting the rounds of Ensign-Bickford Safety Fuse.

Is this war work? Yes! For *Victory begins underground,* and blasting has a new responsibility, a new purpose: to provide more and *more* and MORE of the coal and the metal with which a war is won. The Ensign-Bickford Co., Simsbury, Conn.

Ensign-Bickford

Safety Fuse
Since 1836

Primacord-Bickford
Detonating Fuse

1943 Highway Forecast

THE RESOURCEFULNESS of America's highway engineering fraternity has never faced a severer test than that which confronts it in 1943.

Our entry into the war a year ago abruptly threw some tough problems into the laps of highway engineers and contractors. How they handled those problems of a construction program tremendously accelerated to meet urgent military necessities in the face of machine and man shortages and in a race against time, is written in the record of brilliant accomplishment in 1942.

To be sure, that job is not yet completed; much remains to be done. But now, there is a new problem to face — the effect of nationwide curtailment of automobile operation on 1943 program planning and execution.

How much are tax revenues going to be reduced due to gasoline rationing and other restrictions on automobile travel? What priorities and man power will be available for new construction? If we knew the answer to these questions within reasonable limitations, it would be relatively simple to chart the course of the nation's highway program for 1943.

To highlight the situation, Maine lost $1,260,987 in gasoline taxes in the first nine months of 1942, as compared with the same period in 1941 and, as of late November, 32,000 fewer motor vehicles registered in Massachusetts for 1943 than were registered at the same time a year ago, with a loss of $128,857 in registration fees. Similar figures of any other states would be equally illuminating.

While it is too early to form any definite conclusions, the pattern is becoming pretty clear. It is apparent that the highway program will be pointed in large measure toward two major activities maintenance and post-war planning. The thinking of the officials in charge of highway programs is clearly evident in the state-by-state forecasts on succeeding pages.

So far as the military operations are concerned, 1943 apparently is to be the year in which the United Nations will go aggressively on the offensive. On the highway front, however, the strategy this year will be to hold grimly on to what we have. In other words, it is a matter of keeping the highways in as high a state of serviceability as the most thorough maintenance can provide. That is basic.

The amount of new construction to be undertaken will be small, practically the only work to be done consisting of carryover from 1942 and some important military roads. With few exceptions, the emphasis will be entirely on maintenance.

Consideration of this matter is uppermost in the mind of every official responsible for highway system operations. In spite of an unavoidable curtailment of maintenance activity ranging up to about 30% of normal, the condition generally of the nation's network of main and feeder roads is confidently expected to be maintained to within 90% or better of its normal standards. There is no thought of allowing roads to become "expendable."

The problems involved in the successful accomplishment of this objective are not being overlooked either. In addition to the undoubtedly large cut in funds available to the highway departments, are the accompanying shortages of labor, of supplies and of equipment.

Long range post-war highway planning is receiving top billing in virtually every state highway department today. In some instances funds are being set aside to activitate these plans without loss of time when the go-ahead signal is given. The development of highways of various kinds, the planning of by-passes, elimination of grade crossings, relocations, modernizing main routes, and in some cases far-seeing programs looking ahead 10 to 20 years all will receive the concentrated thought of the nation's top highway experts.

Therefore, 1943 will be a year for consolidating gains made in the national highway construction development over the past years and above all it will be one of fighting to keep our roads in their present state. This will be the year also to conserve equipment and machinery of all kinds, to keep it in tip-top shape through proper care and maintenance whether it is being used or not.

The watch word for 1943 will be "maintenance."

Federal Funds Status

In response to Excavating Engineer's request, H. S. Fairbank, chief of the Public Roads Administration's Division of Information, released the following information regarding federal highway plans for 1943 in a letter dated November 24, 1942.

"We are in receipt of your letter of November 16 concerning highway improvement with Federal funds in 1943. With the beginning of war in December approval of highway projects was restricted to those essential in carrying on the war as certified by the War and Navy Department. Subsequently the War Production Board has been included as a certifying agency.

"The Federal-aid funds apportioned last December and amounts remaining from previous years have remained available technically but use is definitely limited to those projects where access roads to war establishments or to meet other urgent war needs coincide with the systems of roads that may be improved with Federal funds.

"Because of the war Federal-aid funds have not been authorized for the fiscal year beginning next July and there will be no apportionment of funds in December as in past years.

"At the present time the entire program is under detailed review and the need for improvements will be considered in the light of requirements for critical materials, labor and other factors affecting the war program. The need in the war program for each improvement will be weighed against the effect on elements critical in the program.

"On October 1, our defense highway program included 3,402 miles under construction at a total cost of $212,339,000, of which $170,604,000 was to be paid with Federal funds. Projects approved but not under construction aggregated 2,702 miles at a total cost of $141,375,000, of which $117,213 was to be paid with Federal funds.

"Until the review of current and contemplated work is completed and a decision reached by responsible officials we will be unable to state the size of the program in the immediate future. However, there are many projects of such critical importance in the operation of war industries and in military and naval operations that it may reasonably be expected that they will be continued. Since all future work will have a direct war connection it will not be desirable to make public the details by States."

State-by-State FORECAST

Alabama

With a total of about $12,000,000 available for 1943 highway work, Alabama will make a $6,000,000 reduction from the $18,000,000 amount spent for highway work by the state in 1942. An allotment of about $2,800,000 is expected by the state from federal aid funds.

The state plans to spend about 85% of available 1943 funds for necessary construction and maintenance work. The remainder is slated for future highway work and perhaps some will be diverted for non-highway use.

Alabama's 1943 highway work will be equally divided between new construction and maintenance activities. A post-war road building program is being planned by the state. About $428,000, 50% of which are federal funds, have been set aside for plans, surveys, estimates, and other preliminary work.

Currently, Alabama has a $5,000,000 access road program underway and there is a possibility that this program may be enlarged.

Arizona

Arizona's state highway department reports that much of its activity in 1943 will be given over to post-war planning. This will take the form of listing post-war work on prescribed Public Works Reserve prospectus forms, submitting them to Public Roads Administration for review before filing for future activation.

A severe drop in revenue is anticipated. In 1942 state money available for highway work totalled $4,600,000. For 1943 the present estimate is $3,200,000. It is felt that it will be impossible to keep the highway system at its present peak of physical condition and that by the end of 1943 it will be about 80% of normal.

Arkansas

While reports indicate a reduction in state money available for highway work in 1943 of $7,000,000 from a total of $17,000,000 in 1942, it is possible that this reduction may be less than that figure. Arkansas has defense projects scattered all through the state, most of them located 10 to 15 miles from towns. Public transportation is very meager and the majority of the workers will continue to use their cars; it is believed that this additional defense driving will offset a considerable loss in tourist gasoline tax income.

Arkansas is planning to do a relatively large amount of new construction work, the available funds being divided approximately 60% for new construction and 40% for maintenance.

While highway funds are pretty well frozen, federal funds may be available for work on highways designated as access roads by the government. In 1942 quite a few such projects were eliminated and the money allocated remains on hand. For use on access roads, Arkansas has on hand at this time $2,130,000 and for grade crossing eliminations $530,000. These two items do not have to be matched by the state.

There also remains available regular federal aid to the amount of $705,000 and secondary, $436,000 or a total of $1,141,000. The state can match these funds.

It is estimated that at the end of 1942 the physical condition of the state highway system was about 95% of normal, but no estimate is hazarded as to the condition of the roads by the end of 1943.

California

California's department of public works has released the following information:

California is an area of military operations and the location of numerous military and naval establishments as well as a multiplicity of war industries. Because of these conditions a great deal of access road construction has been necessary throughout the state. The access road program as developed for California included road and bridge projects requested by the military totaling a value of more than $45,000,000. Between the time of Pearl Harbor and November 1, 1942, the California Division of Highways had placed under construction 81 access and flight strip contracts costing nearly $21,000,000. Additional projects for such defense construction estimated to cost more than $10,000,000 are ready to be let to contract and are now pending federal certification or assignment of priority preference ratings. The remaining projects in the access program have been deferred by federal authorities and on many of them surveys, plans and specifications are complete.

During the seventeen months of the current fiscal biennium, (California state highway affairs are operated on a biennial instead of an annual basis) covering the period from July 1, 1941 to June 30, 1943, construction on the normal state highway program has been advanced as far as ever-increasing war restrictions of priorities and conservation directives have permitted. On October 1, 1942, major state highway construction projects included in the biennial budget had been placed under way to a value of more than $20,000,000. This amount is approximately 53% of the $38,000,000 set up in the budget for major construction. Much of this work was begun prior to the outbreak of the war and since that time most of the projects for which allotments were made have been situated on the strategic network and designated as essential to the war.

At the present time and for the future the highway situation under federal control of materials, equipment and construction operations resolves itself into maintenance and such construction and reconstruction as is certified as essential by the military.

Decreases in traffic volumes for the state highway system has been in progress for some time. The July, 1942, count showed a general decrease on the state sys-

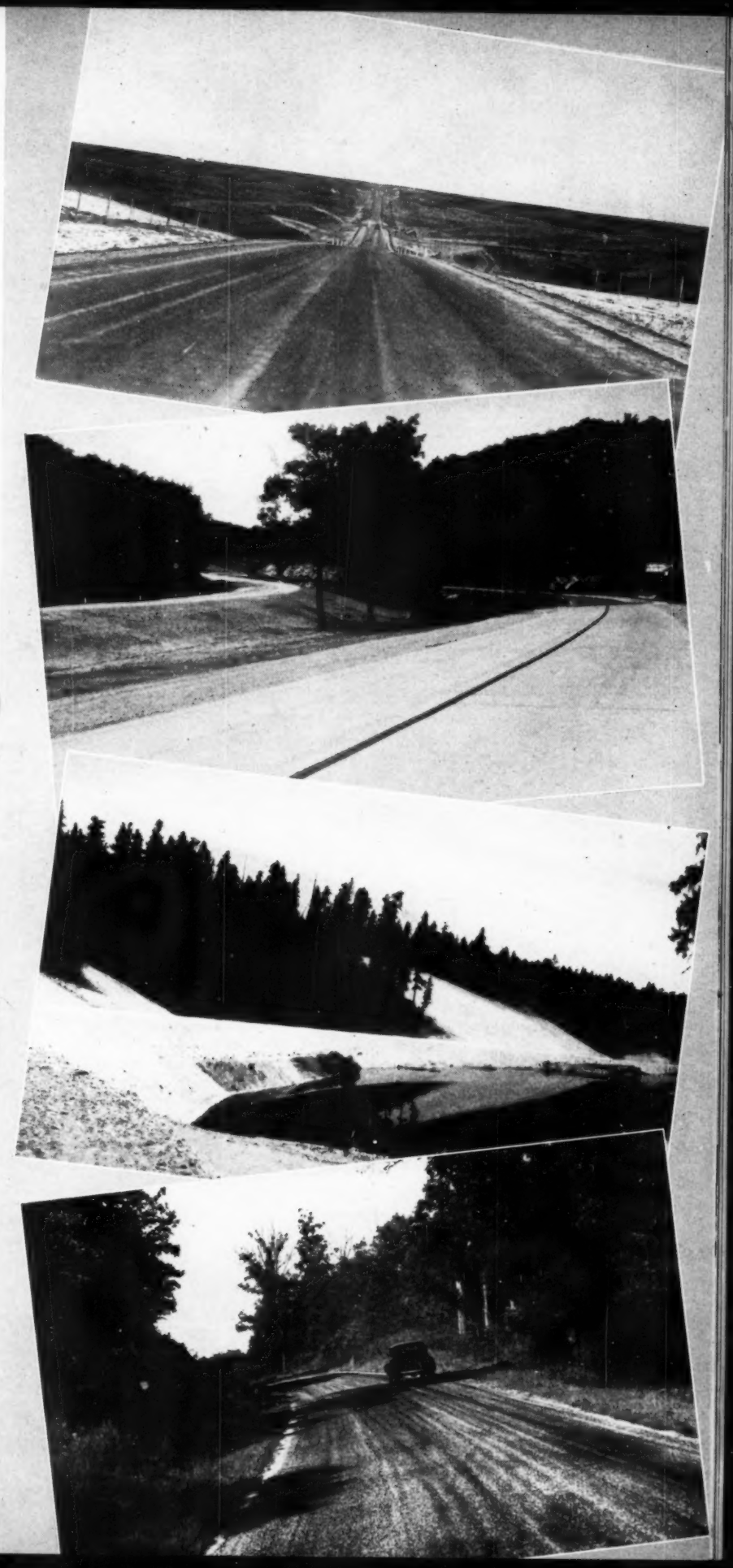
tem of 17.7% from the July, 1941, count. On specific routes this decrease went as high as 55%. Certain heavily traveled arterials feeding areas of concentrated industrial activity showed increases of from 14% to 18%. These localized increases, however, are not sufficient to offset the general decline in travel and the corresponding reduction in gas tax revenue.

From the indicated decline in traffic and with the benefit of the experience of gas rationing in eastern states, it is estimated that within a few months the revenue from the gas tax will be less than last year's revenue by more than 35%. The accuracy of these estimates was substantially confirmed when the October, 1942, apportionment of gas tax revenue amounted to 15.8% less than the October, 1941, apportionment as compared to the state's estimate of 15%.

On the basis of the estimated revenue, it has been determined that a reduction of $6,500,000 will be necessary in major projects included in the current budget to balance the budget between now and June 30, 1943.

For the biennium beginning July 1, 1943, estimates of reduced state revenues for rural state highway work indicate that there will be available approximately $43,000,000. This amount is 40% less than the $72,800,000 which had been set up for this purpose in the revision of the state highway budget on November 10, 1941.

The principal program for the coming biennium will be one of maintenance and holding what the state has by resurfacing and reconditioning highway surfaces with bituminous blankets and by repair and preservation of bridges. If California roads essential to the prosecution of the war are to remain in serviceable condition, the resurfacing of some 800 miles at an estimated cost of approximately $7,500,000 must be accom-



• Our country's roads, ranging from superhighways to county trunk routes, form a vital network important to the nation's welfare. Top to bottom: U. S. 83 in South Dakota; Wisconsin's 4-lane U. S. 12; a newly graded portion of U. S. 2 in Montana; and Route 49, a bituminous-topped road between Asheboro and Concord, North Carolina.

• America's Number 1 highway project of 1942 was the Alcan Highway. Here, Caterpillar diesel tractors and LeTourneau scrapers join forces during rough grading operations.

plished as soon as possible.

General maintenance will be drastically reduced on nearly 2800 miles of state highway so that essential roads may be kept in service with the limited revenue available.

Lack of materials, equipment and equipment repair parts will certainly play a large part in reduction of state highway activity.

Diminishing manpower is an equally serious problem.

On January 31, 1941, the personnel of the California Division of Highways numbered 5338. Since that time 3,109 state highway employees have taken military leave or have resigned, many to enter the more lucrative field of defense industry. Of the 3,109 who have left state highway service, 471 have been sworn into the armed forces. Of course, this total does not mean that the department has lost 60% of its personnel as included in the resignations are quite a number who were hired during the period for temporary or seasonal work; it does mean, however, that an extremely abnormal, difficult and heart breaking situation of losing a large percentage of trained individuals and attempting to replace as many as possible from a rapidly diminishing market of employables with persons requiring considerable training.

The entire problem resolves itself into four principal factors: lack of materials; lack of equipment and inability to obtain repair parts; shrinking finances; and greatly reduced man-power.

Solution of this four-fold problem will be accomplished to the best of the state's ability, with the one idea in mind that serving the war effort is of first importance.

For operation during the emergency, the division of highways has adopted a four-fold policy which includes: first, maintenance and reconditioning of highway surfaces to serviceable conditions; second, upkeep and repair of bridges, reducing as far as possible the number of posted structures; third, preparation of plans for needed highway construction during the period of adjustment after the war; and lastly, insuring the integrity of highway development already begun by acquisition of adequate rights of way for planned improvement.

Colorado

According to their 1943 highway budget, the Colorado State Highway Department plans to cut its expenditures about four and half million dollars below the amount spent in 1942. Expecting a $2,610,000 drop in gas tax and motor vehicle fee receipts alone, the state is planning to limit its entire expenditures to $4,787,485 in 1943. Of this amount $2,895,033 have been set aside to match federal aid funds for planned projects, and $1,061,452 will be used for maintenance and maintenance equipment.

Colorado estimates a reduction from 40% to 50% in gas taxes and motor vehicle fees. However, a fair amount of federal activity in the state is expected as Colorado has several strategic war projects that will need access roads.

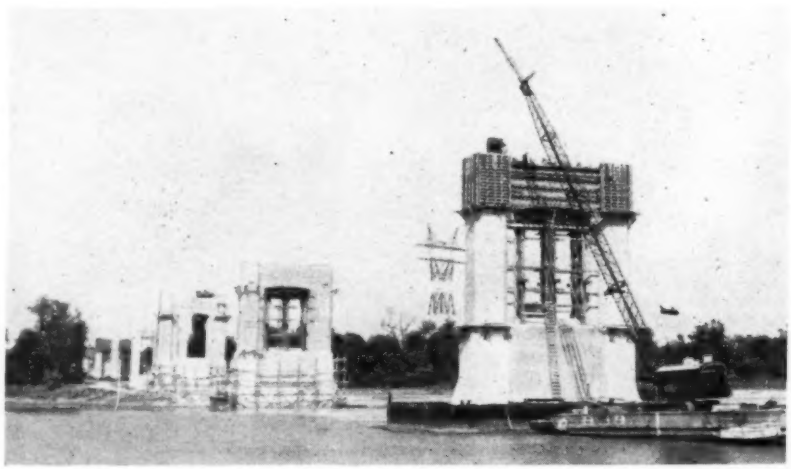
The state expects to continue its development of plans for post-war projects to assure future construction activity.

Connecticut

According to information received from Connecticut's state highway department, survey and design of projects to be built after the war are now being laid out to total a construction cost of about $20,000,000.

For the fiscal year ending June

• One of Connecticut's major construction jobs in '42 was the completion of the Hartford-East Hartford bridge. A crane is shown pouring concrete on one of the piers.



30, 1943 a reduction of about 28% in the amount of state money available for highway work is anticipated, and for the fiscal year ending June 30, 1944 a further reduction of 31% is indicated. For the fiscal year ending next June, federal funds for highway use are expected to be in the neighborhood of $2,100,000.

All available funds will be used for necessary construction and maintenance work, the proportion being about 3 to 1 in favor of maintenance.

In view of the circumstances, the department's estimate of the physical condition of the highway system as compared to normal by the end of 1943 is 80%. This represents a drop of 10% from the highway system's condition at the end of 1942. The entire drop is attributed to an anticipated shortage of labor.

Delaware

No estimates could be obtained as to the amount of state money available for highway work in 1943 or the effect of gas rationing and other restrictions on the highway income.

Federal funds amounting to $670,313 have already been allotted for 1943 work. This is divided as follows:

Regular	$487,500
Secondary	85,313
R. R. Elimination	97,500

Delaware's state highway department feels confident of its ability to maintain the highway system without reduction in efficiency, and is planning to provide sufficient maintenance to keep traffic essential to the war effort in as good condition as possible.

Future planning is being laid out along the lines of securing right-of-way for building dual and divided types of highways and important grade eliminations and by-passing of cities.

District of Columbia

With a total of about $2,400,000 in highway funds available for 1943, the highway department is planning to concentrate entirely on maintaining its system of roads with no new construction planned. Ten per cent of available funds will be set aside for future highway work, while the balance will be used for necessary maintenance.

It is felt that with this concentration upon maintenance that the department will be able to keep the roads in their present condition without any drop.

No federal funds for 1943 highway work are anticipated as the allotted funds have already been expended.

Florida

C. H. Heffords, of Florida's State Road Department wires the following:

NO MAINTENANCE OR CONSTRUCTION WORK IN 1943 WILL BE SCHEDULED UNTIL MARCH.

in 1942, 1943 is expected to yield only $2,500,000—a cut of almost 50%. In view of this, a reduction in the maintenance of the state highway system of 20% seems unavoidable.

It is estimated that this reduction will be due 50% to shortage of funds and 25% each to shortage of equipment and labor. Federal funds to the extent of $1,000,000 are expected to supplement state money for highway work. One hundred per cent of all moneys will be used for necessary construction and maintenance, none being diverted nor set aside for future use. Some advance engineering

• This freshly oiled road in Adams County, Idaho, shows the results of careful maintenance attention.

Georgia

A wire from Georgia, signed by R. W. McCrum, office engineer, State Highway Board of Georgia, reports:

IMPOSSIBLE TO FORECAST CONSTRUCTION AND MAINTENANCE FOR 1943 UNDER PRESENT CONDITIONS.

Idaho

Of the available funds anticipated for 1943, reports indicate that 40% will be expended on new construction, the balance going into maintenance work.

In this state of relatively thin population and great distances, the effects of gas rationing will be particularly severe. As compared with $4,800,000 of state revenue

projects will be developed for postwar consideration.

Illinois

While the effects of the loss of revenue due to gasoline rationing are impossible to predict at this time, information secured from the state highway department indicates that 1943 state fund revenues will be in the neighborhood of $56,000,000. Gross highway revenues for 1942, exclusive of federal aid, will reach about $73,000,000. While these are rough estimates only, the figures include the counties' and municipalities' share of the gas tax.

Federal aid funds of $7,300,000 have been allotted, but not yet

(Continued on page 44)

Preventive Maintenance

Invest in a small amount of inspection time now, save heart-breaking shutdown time later. That's the moral of this article, and it's worth reading if you own or operate electric excavating equipment

By L. V. WINCHESTER
Executive Engineer, Bucyrus-Erie Company

EDITOR'S NOTE: The cartoons on these pages are reprinted through the courtesy of Allis-Chalmers Manufacturing Company, from their handbook "A Guide to Wartime Care of Electric Motors."

IN THESE DAYS of all out war effort to produce a maximum of the things needed for aggressive action against our enemy, essential materials must not be diverted to make repairs to equipment when the necessity of using such material could have been avoided by preventive maintenance. This is true of many things and in particular of the electrical equipment on excavating machines.

Before the war, a breakdown of electrical equipment meant some inconvenience due to the machine shutting down for repair or replacement—really a dollar and cents proposition. If a company could not produce in time to satisfy a customer there was always a competitor who was able and quite willing to take over. Today, it is much more than a matter of dollars and cents because each of us is required to produce continuously at our maximum and there is not likely to be anyone to take up the slack and make up for our deficiency without curtailing some other part of the war effort. All of us must carry a share of the load equal to the very best of our ability.

Excavators, being more or less portable, may be quite a ways from an electric repair shop and consequently the electric inspection and the accompanying tests must be done with a minimum of equipment, preferably with tools and equipment a man can carry. It is with this in mind that the following remarks are made. Any program of inspection decided upon should be practical enough so that it doesn't bog down for lack of test equipment or lack of time. The man who makes the inspection should be capable of correcting minor troubles right on the job; and the more serious troubles can be scheduled for his own shop, or the expert's shop in the nearest city.

Electrical equipment maintenance resolves itself into the problem of keeping suitable insulation on the parts which carry current, keeping the operating temperature close to normal, and correcting for excessive mechanical wear. These problems quite often are inter-related and it is not unusual to find that mechanical wear, if neglected, does not show up until there is some strictly electrical failure. Mechanical wear also can affect the proper functioning of electrical parts such as relays, protective devices and contactors.

Computing Insulation Resistance

Insulation for current carrying parts is selected in the design of apparatus, and also for wires and cables, to last for years; and the detection of reduced insulating properties therefore, is a long range problem. It means periodic testing and comparison of the values because it is not a question of something having good insulation or poor insulation, but rather a question of how good or how bad. "Insulation resistance tests" measure the resistance between the current carrying parts and ground. These tests are not diffi-

Your Electric Excavators

cult to make, and they tell quite a story after one becomes accustomed to interpreting the readings. A "Megger" is the handiest and simplest device for measuring this resistance as it is self contained and gives a direct reading. A DC volt meter using a battery as a source of supply is another device which is likely to be available and while their use requires calculation to obtain the value of insulation resistance, it is not difficult. Connections of the DC volt meter are made as follows:

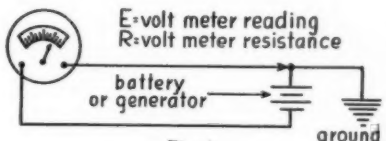


Fig. 1

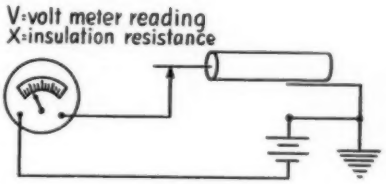


Fig. 2

One side of the battery is shown connecting the ground, however this is shown only as a matter of convenience and to make it easier to compare to the connections in Fig. 2. The connections in Fig. 1 are merely a means for obtaining the voltage of the source of supply which may be a battery or a generator. In Fig. 2 one of the volt meter leads is attached to a current carrying part and the resistance of the insulation is thereby put in series with the volt meter. The reading of the voltmeter in Fig. 1 and the reading in Fig. 2 are proportional to the total resistance (the resistance of the insulation plus the resistance of the meter), and the resistance of the meter. It can be expressed in the equation

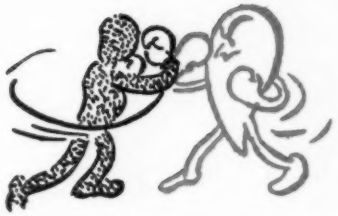
$$X = \frac{E - V}{V} R$$

The larger the reading of the meter in Fig. 2, the lower the value of the insulation resistance (X) must be. After taking the two voltage readings and knowing the resistance (R) of the instrument (usually stamped on the dial) it is a simple matter of arithmetic to find the value of (X).

The insulation resistance should be quite high, varying from one meghom (1 million ohms.) to as high as 100 meghoms. Several pieces of apparatus, or several pieces of wire, tested at the same time will show a lower value of resistance than one piece only, as there are several paths in parallel. In order to reduce to a minimum the number of tests taken at any one time, the apparatus and wiring should be connected to each other as far as is convenient. If only one reading per machine is taken each month, the records to be kept are much simplified, and may even be remembered by the electrician. It may be more practical to take two readings than one as on a drill where the motor primary circuit and the motor secondary circuit are normally isolated. In the case of a shovel it may be more practical to make a test on all the AC circuits and a second test on all the DC circuits.

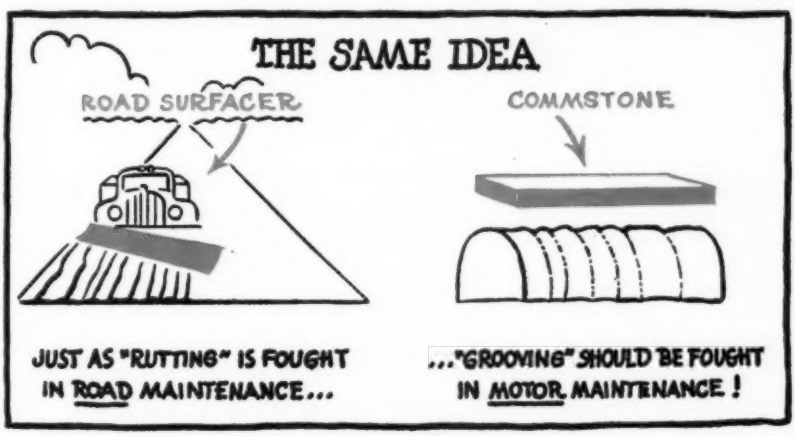
Clean Out Oil and Dust

Once a month should be often enough for such tests; and usually on new machines the tests can be taken every two or three months, continuing at those intervals until the readings show a decided and general trend of reduced resistance. At such a time it is advisable to segregate this record in order to find which part of it needs further examination. The trouble is likely to be due to an accumulation of oil and dust; or to the chafing of insulation in a place not visible to the casual glance. These insulation resistance tests indicate the deterioration which progresses slowly and because of the inspection time involved are normally overlooked. A military commander would be negligent in not testing out the enemy lines for weak spots; that's just the way electricity constantly finds the weak spots and shortest paths. It's the electrician's job to beat nature to it and find these weak spots before the electrical force.


DUST FIGHTS LUBRICATION

In excavating work, various pieces of electrical equipment can meet a sudden violent death or become seriously damaged by some accident such as being caught in a landslide, or accidental short circuiting of live parts. While such things tax the ingenuity of an electrician and patience of a purchasing agent, they are rather out of the scope of routine maintenance.

Insulation can be tested by a


THE SAME IDEA
ROAD SURFACER
COMMSTONE
JUST AS "RUTTING" IS FOUGHT IN ROAD MAINTENANCE...
..."GROOVING" SHOULD BE FOUGHT IN MOTOR MAINTENANCE!

"high potential test," that is by a voltage which is several times the normal circuit voltage, but this kind of test is not made very conveniently on machines in the field. The interpretation of such a test is that the insulation is favorable, or it is not favorable. The unfavorable condition shows up by having the insulation break down, and that usually is accompanied by an arc and consequent burning of certain parts. If the machine is down for some time as a result of this burning, the tests have defeated their own purpose which is to keep the machine operating as much as possible.

The electrician should keep himself informed at all times of the general condition of the electrical equipment, and he can do that best by frequent and periodic inspection. A chart can show what is to be checked and can include the dates of inspection, and anything which appears to be unusual, or requires further investigation.

AC Motor Inspection

Squirrel cage motors are not particularly complicated in their construction, but they do need inspection periodically to be sure excess dust is not accumulating around the coil and in the air passages, thereby causing higher operating temperatures. An inspection may show that the leads at the terminal box have become damaged, or that there may be excessive grease present, or that there is some unusual vibration. If these do not appear to be serious, they can be noted and taken care of at a more convenient time. The hottest spot of a motor is on the inside where most of the heat is generated, consequently it is important to keep the inside clean. An electrician should not rely too much on his ability to judge temperature by placing his hand on the motor, a thermometer is much more accurate and can reach places where the hand cannot.

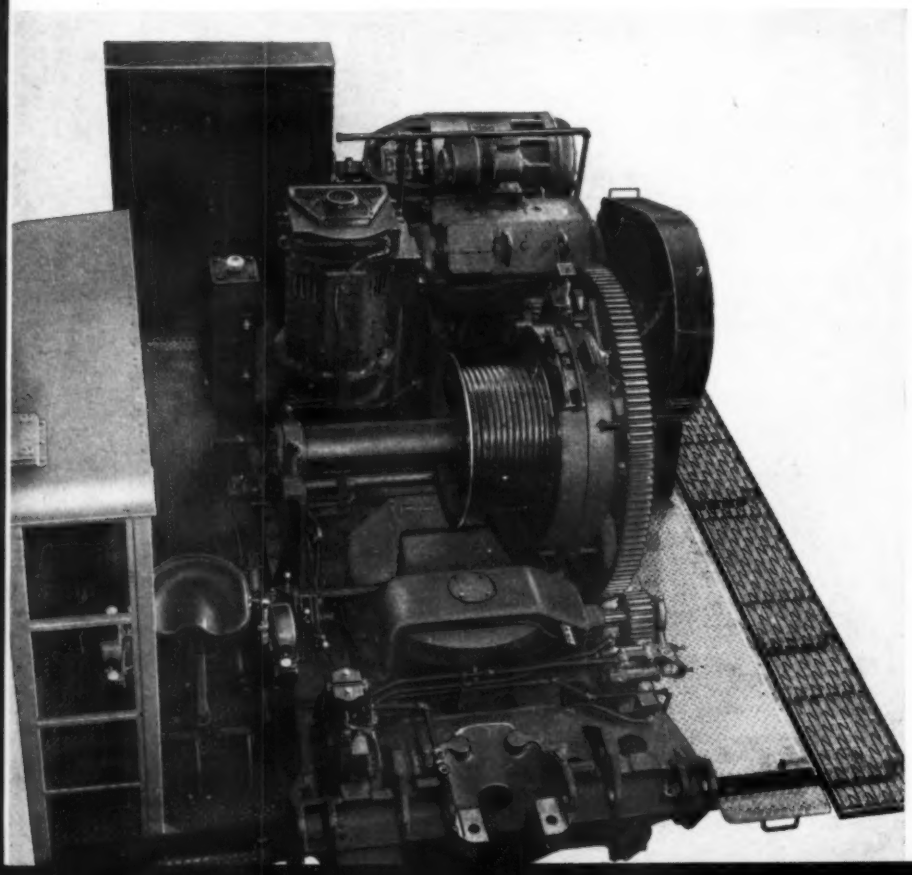
A portable motor driven blower is a good tool for blowing out the dust and a hand operated bellows is good too if operated fast enough. Although air from a compressor line which may be on or near the machine is quite effective for removing dust, it often carries moisture, oil, and abrasive dust particles that are harmful to motor windings.

Wound rotor motors require the same care as squirrel cage motors and in addition there are the extra set of rotor windings, and a set of collector rings and brushes. The rings must be watched for burned spots, rough surfaces, and for unusual amount of eccentricity. Brushes should slide easily in the brush holder, have a good fitted surface at the ring, and should not be allowed to wear down to such an extent that any metal part of the brush bears on the ring, or that the "pig tail" starts binding. A synchronous motor presents no additional problem in maintenance inspection as it has the same class of parts as the wound motor rotor.

DC Motor and Generator Care

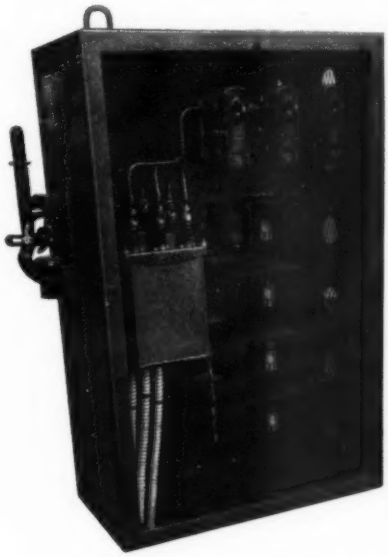
The direct current motor (also the DC generator) has windings which require the same care as other motors, and in addition it has a commutator. This commutator must be kept clean, particularly in the places where there is insulation. Each commutator bar is separated from its adjacent bar by insulation, usually mica, and on excavators in particular, this insulation is cut away so that its surface is slightly below the surface of the bar. This "under-cutting" makes a place for carbon dust and other conducting material to accumulate; with the ultimate result of short circuiting two bars, and consequently an armature coil. This means extra heating and eventual break-down of the coil insulation. The V-ring which holds all of the commutator bars together is also at ground potential, and dust can accumulate between the bars and the V-ring with similar results unless it is kept clean. Emery cloth should not be used for fitting brushes or for cleaning the commutator because the particles of emery dust are of a conducting nature and therefore can cause trouble. For cleaning the slots and crevices around the commutator bars use a bristle brush or a metal scraper.

Some generators have bars leading directly upward (radial-



• Generator, switch cabinet, hoist and swing motors are important parts of the main machinery of an electric shovel. Careful maintenance of these units are essential to the operating efficiency of your excavator.

ly) from the commutator bar and carbon dust should be cleaned out of the spaces between these bars which are also known as risers. A carbon brush is one of the principal parts of a motor or generator, and while it has considerable wear, it is also a current carrying part. Replacements are required fairly frequently, and they therefore require regular inspection. Replacement brushes must conform very closely to the original specifications to provide continuous good service. If circumstances make it necessary to change the grade of brush, don't stop at the replacement of just one brush, or



• This starting cabinet, on a 6½-yard electric shovel, houses the oil circuit breaker and transformers.

all of those on one stud, but change all of the brushes on that particular motor or generator.

Maintaining perfect commutation is not easy, for in addition to the brushes being of the proper grade they must also be fitted almost perfectly to the commutator surface which must be in good condition. If the commutator surface is rough, eccentric or grooved, its ability to commutate satisfactorily is reduced. A small amount of roughness can be removed by a piece of canvas or a block of wood pressed against the commutator while it is rotating. A greater degree of roughness may require the use of a fine sand-

• Giant electric stripping shovels of this type, varying from 30 to 35 yards in dipper capacity, are making possible the efficient development of the country's bituminous coal fields. Preventive maintenance will insure the continued effort of these important machines.

paper followed by either the wood or canvas polishing. Deep grooves or a large amount of eccentricity are removed by putting the armature in a lathe and taking as small a cut as is necessary. In practice this is not done unless poor commutation indicates the necessity. Bearings certainly are not an unimportant part of a motor or generator, however, their care will not be discussed here except to caution against over-lubricating. Ball bearings and roller bearings on high speed apparatus in particular should not have an excessive amount of grease as there is considerable heat generated by churning the grease in a confined space.

All electrically operated excavating equipment includes motor starting devices such as oil circuit breakers, safety switches, AC magnetic switches and DC magnetic switches. The principal thing to inspect in such devices is their freedom of movement and the excellence of the surfaces forced into electrical contact. Almost all of the oil circuit breakers used on excavating machines are manually operated and as they are operated every day, any binding or excessive wear of the operating mechanism can be observed in time to permit correction before a shutdown of the machine is necessary. The oil in the breaker serves the purpose of arc quenching, insulating, and cooling and must be inspected regularly for carbonizing, moisture, and for proper level. Since there is such a small amount of oil in an oil circuit breaker that it hardly pays to have it tested, the practical thing to do is to change to new oil occasionally, about every year or so.

Magnetic Contactors

AC magnetic contactors should be operated by hand frequently to be sure they are in good mechanical condition, observing at that time the action of the springs, the wiping contact and the pivot point. The wiping contacts which consist of the stationary and movable contact tips should have bright surfaces, but not necessarily smooth surfaces. The formation of a dark colored, hard spot (copper oxide) should not be permitted to remain as such spots have high resistance, and therefore cause further heating and more hard spots. These hard spots can be removed by filing or grinding, but the contact tip should not be used again if so much metal has been removed that the spring is unable to put sufficient pressure between the stationary and movable tips. AC contactors can be noisy, which in itself is not particularly objectionable on an excavator, but it does indicate that the parts have worn excessively or that the shading coil in the face of the laminated iron magnet has become damaged. Be alert to such noises and other symptoms of less-than-perfect operation, track down their cause, and be prepared to correct the trouble before it becomes serious.

(*Continued on page 36*)

North Range Mining Company employs the E. W. Coons organization to open up and operate a 274-foot deep iron ore pit on the Mesabi Range. Here's how they produced 1,325,000 tons of that all-important metal

EXCAVATION of a deep pit in a confined area usually means problems aplenty, but when that excavation produces 1,325,000 more tons of iron ore for the war effort those same problems are on the "must solve" list. Under the management of the North Range Mining Company, E. W. Coons Company, Inc., operating agents, are doing just that at the Schley mine near Gilbert, Minnesota.

Operated by Republic Iron and Steel Company as an underground mine from 1910 to 1923, this Mesabi Range mine was brought into the open pit classification in January, 1941, when the Coons organization moved in and began preliminary stripping operations. Early development of this 40-acre mining property with a pit area of about 25 acres, called for the removal of 1,400,000 yards of clay and conglomerate overburden averaging about 120 feet in depth. About 55% of this yardage was stripped by Nieniber and Pettyjohn on a sub-contract. This firm employed two 1½-yard Lima's to complete their portion of the work. E. W. Coons Company, Inc., handled the remaining 45% of the yardage with a Bucyrus-Erie 54-B equipped with a 2½-yard dipper.

Stripping operations were almost continuous as the machines worked 20 eight hour shifts per week, stopping for a full shift on Sunday for general maintenance attention. This fast pace of development enabled North Range Mining Company to ship out its first ore from the Schley mine in June, 1941, just six months after the 1,400,000-yard stripping job was tackled. During the winter of 1941-42, about 800,000 more yards of overburden were removed to prepare the mine's pit area for ore removal operations. Today, under the active supervision of R. A. MacDonell, general superintendent for Coons Company, the Schley mine is loading out about 3,000 tons of merch ore per 8-hour shift. With a production of 425,000 tons of ore under its belt for 1941, the mine produced 900,000 tons of ore during 1942. Operating in a confined area at an ultimate depth of 274 feet, the Coons organization has had to cope with various difficulties typical of mining operations carried on in a small, deep pit.

Tackling Hauling Problem

Major problem in planning the Schley mine development was the transportation of the iron ore to railroad cars, so that costly truck hauls up the steep, winding access road, made necessary by the size and depth of the pit, could be avoided. Minor chestnuts, but none the less important, were solutions to the problems of spoil disposal, drainage and prevention of side slides.

The answer to the haulage problem was the installation of a 660-foot conveyor system to handle the toughest part of the iron ore's journey from pit to railroad car. Constructed in two 330-foot lifts through a tunnel with an 18° incline, the conveyor transports iron ore on a Manhatten Rubber Company 30-inch six ply belt from a point about 30 feet above the pit floor (at the time of the writer's visit) to a head frame near the edge of the pit.

Two Bucyrus-Erie 54-B shovels, equipped with 2½-yard dippers, are performing the excavating duties in the Schley mine. One of the shovels works continuously in ore, while the other cleans out pockets of lean ore rock and waste, as well as taking an occasional turn at ore loading.

A fleet of seven Koehring Dumptors and ten miscellaneous trucks of 4-yard capacity are kept busy hauling merch ore to the grizzly feeding the conveyor belt and transporting waste material and lean ore rock to spoil pile areas outside the pit. The Koehring Dumptors, powered by General Motors diesel engines, are hanging up a good performance record on this operation. Carrying eight tons of ore in their 4-yard

• This recent general operations view of the Schley mine shows a drill completing a pattern of blast holes and a shovel loading out ore. Note dumping station feeding conveyor belt in background.

bodies, these hauling units make full use of their ability to make short turns, fast backups, and

quick dumps in the close quarters of the pit area and the short haul

• Taken in June, 1941, this illustration shows a Bucyrus-Erie shovel equipped with a 2½-yard dipper loading out some of the first Schley mine ore to a Koehring Dumptor.

tons are lean ore and waste material. The pit area is being excavated in cuts averaging 15 feet in depth. However, the presence of some lean ore formations and occasional quartzite seams make a set pattern of development impossible. Getting rid of this waste material keeps the second Bucyrus-Erie 2½-yard shovel busy

most of the time as it moves about the pit opening up merch ore areas for the loading shovel. Since the confined area makes it difficult to avoid a rather steep pit wall, the danger of side slides is constantly observed, and whenever necessary wooden cribbing is built to avoid this possibility.

(*Continued on page 38*)

• One of the Koehring Dumptors roars down the haul road after delivering eight tons of ore to the conveyor belt grizzly. Short turns, fast backups, and quick dumps are this unit's strong points.

...g a Deep Pit Iron Ore Mine

to the conveyor grizzly.

One shovel working exclusively in ore loads out about 3,000 tons in eight hours. During a typical operating month, working two 8-hour shifts per day, the mine equipment handles 170,000 tons of material. Of this amount, 65,000

• Vertical blast hole drilling duties at the Schley mine are competently handled by this Bucyrus-Erie 27-T drill. About 20 six-inch holes averaging a depth of 15 feet are shot per blast.

How To Increase *Your Shovel Output*

First of a series of articles discussing some of the ways you can do more with your present equipment, and make it last longer at the same time

UNDER the demanding conditions of war time, it is especially important to review some of the simple, basic things that can be done on any digging job to make available equipment do more — and last longer at the same time. There will be no "magic" discussed here; nothing that nearly every dirt-moving man doesn't know. But many of the things that can be done to step up output aren't done; either because it seems on the surface that there isn't time to do them, or because those in charge of the job temporarily forget the basic principles they know so well.

Fundamentally, the efficiency of any digging job can be analyzed by time and motion study. If drilling, blasting, loading, hauling and dumping are reduced to the smallest possible **number** of motions, and each motion is made as short as possible, the job will break records.

Take a simple shovel-loading-dirt job as an example.

We're loading from a bank. We've selected the best size shovel for the job. Our trucks have been picked so we can load them full with the most efficient number of heaping dipper loads. No sense in taking an entire extra pass with the shovel to get the last fraction of the load in the truck; and no sense, either in sending a truck off with a partial load. It's important to make sure that dipper loads and truck capacity match (that truck capacity is an even multiple of actual dipper capacity).

The number of trucks we've put on the job is enough, considering the length of haul, so that the shovel will have to wait as little as possible. We want to approach as closely as possible the theoretical ideal that neither shovel nor truck should spend a single unproductive minute. (One of the common ways to do this is have an extra truck or two, the exact number determined by experience, so that breakdowns and unavoidable shop time will not cut down the speed of the flow of dirt from bank to dump). We've given due consideration to selecting the best personnel available for the work; and we've paid careful attention to the important question of general safety.

Having arrived at this enviable state, let's sit on the bank, stop watch in hand, and watch the dirt fly. Since the dirt loading cycle is a constantly recurring thing, if we can cut down cycle time by a fraction of a minute, we'll speed up the progress of the job tremendously.

Here are some of the things we'll watch for:

A. Truck Spotting

Every effort should be made to eliminate unnecessary motions of both truck and shovel. If job set-

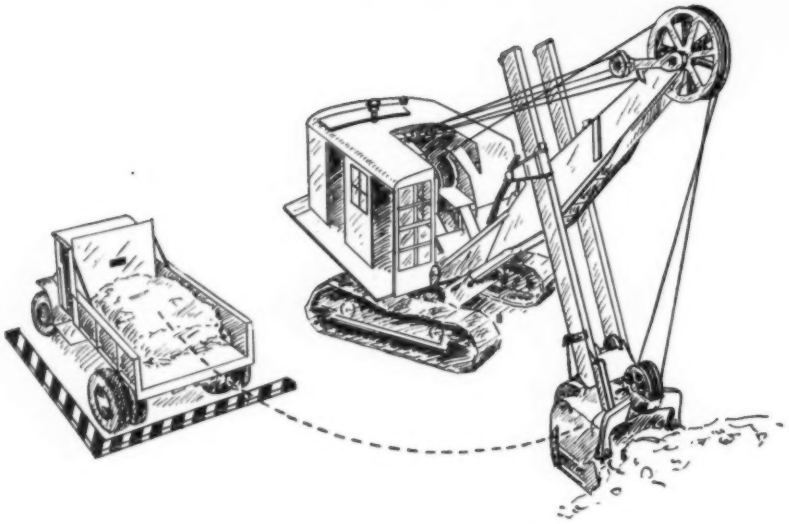
Below, left: Good example of hauling unit being loaded with longest part of body in line with arc of dipper swing. Right: Here, bad spotting of truck has forced shovel operator to needlessly extend his dipper stick. These waste motions soon add up to hours of production time lost.

Right, top: On most jobs, double spotting is the answer to efficient truck loading. Time consumed spotting and loading is cut to a minimum by this method. Center: In maneuvering the dipper for close-in work, a good operator will avoid hitting the track pads. Bottom: Correct spotting of hauling units enables the shovel operator to work out and hold to an efficient operating cycle.

up permits its use, two-truck spot is the most efficient method. While the shovel loads one unit, the second can be getting in place on the other side. Trucks should be spotted in as close to shovel and bank as possible in order to cut down shovel swing time. Since swinging normally takes 60% of the shovel cycle, any reduction in required swing will add up the output.

Whether double-spotting is used or not, trucks should always be spotted so the long way of the body is along the arc of the dipper's swing (See accompanying sketch), and at the same distance from the shovel. If this practice is followed, the shovel operator can crowd his dipper exactly the same amount on every pass and for every truckload. No precious time need be lost juggling the dipper in or out to find the proper dumping location. Trucks should always be spotted so the loaded dipper comes in over the rear, not the cab.

If a good operator can set up a regular rhythm to his cycle, he'll give you real yardage, and proper



• A correctly spotted truck presents the largest dumping area possible when its body is parallel to the arc of dipper swing. Note the L-shaped truck spotting guide that can be constructed from a couple pieces of 2x4.

truck spotting is one of the biggest helps to him in getting that rhythm set.

The movement of the trucks should be studied carefully to cut out all possible backing and juggling for position. These not only mean extra wear on the truck, but tire out the driver as well. Use of a regular truck spotter will pay big dividends on many jobs. He can do a lot to keep the dirt "flowing." Perhaps a couple of lengths of 2x4, painted white for visibility, and nailed to form a right angle could be placed in position so the drivers could spot their trucks accurately in the shortest possible time. These "guides" could easily be moved as the digging progressed.

B. Haul

The type and length of hauling road will naturally be determined by the individual job. It should, of course, be carefully studied in advance, with particular attention paid to ways in which the road can be developed efficiently as the job progresses.

Once the job is in progress one of the most important things to keep in mind is the condition of the hauling road. Speed of trucks in work, as well as maintenance requirements, will depend largely on the condition of your road. On many jobs it will pay to keep one or more road graders or tractor blades constantly at work keeping dirt sections of the road in good condition. Even if the road needs little attention in good weather, a standby grading unit may pay out richly during wet spells.

When your job is running smoothly, study the hauling cycle to see if it can safely be speeded up. Time the round trips and see if there are any unnecessary steps. Quick handling of trucks on the dump is especially important. Often a bulldozer at the dump to keep material spread as fast as the trucks deposit it will be worth while. Perhaps the dump can be organized so no backing of trucks is required. If material handled is wet and sticky, perhaps the shovel can dump a thin layer of dry material on the bottom of the truck before loading it. The wet material will then slide out easily when the truck is dumped. Seconds saved on the dump mean big yardage added to the day's output figures. In trying to speed up the dumping and hauling cycle, remember the paramount importance of safety. It's day-in, day-out speed that counts, not the speed of one trip, or even of one part of the cycle. The whole job must flow smoothly if real war-necessary progress is to be achieved.

Maybe you're finding it increasingly hard to get men for your jobs as the size of our armed forces expands. If you've studied and laid out your work carefully to require a minimum of effort by your truck drivers, you may be able to use women. The fair sex

(*Continued on page 41*)

• A heaping dipperful every swing means a sizeable amount of extra yardage moved at the end of a shift, so much more pay dirt for the war effort!

Charles F. Spencer

Charles F. Spencer, president of the Pittsburg & Midway Coal Mining Company and a leading figure in the southwestern coal fields for a quarter of a century, died in Pittsburg, Kansas on December 1, 1942, at the age of 69. These cold statistics mark the passing of a man, but they cannot begin to convey the great loss his death will be to his industry and his country. For, Charles Spencer was a man in the true meaning of that word.

Born January 14, 1873, on a cattle ranch in Cherokee County which was homesteaded by his father, the late John W. Spencer, Mr. Spencer moved to Columbus with his parents as a boy in his early teens. Although his father believed the cattle business offered many opportunities for him, Charles Spencer first decided to become a lawyer, but changed his mind and entered the coal business when at the age of nineteen he became bookkeeper for the Columbus Coal Company, headed by his father.

Following in the footsteps of his father, Mr. Spencer quickly gained prominence in the coal business; becoming treasurer, general manager, and president of the Columbus Coal Company in rapid succession. The Spencer-Newlands Coal Company then was formed with mines at Mulberry, Kansas, Mr. Spencer's associate being the late C. Newlands. In 1911, Mr. Spencer purchased controlling interest of the Pittsburg & Midway Coal Mining Company, succeeding the late pioneer operator, John N. Hodges, as general manager. In a later reorganization, he became president of that company.

The Spencer family pioneered the coal mining business around Pittsburg, Kansas, when in 1868 they formed the Columbus Coal Company at a time when little was known about the mineral wealth of this region. Mining in this area was still in its infancy when Mr. Spencer joined his father in the business. However, as Charles Spencer developed with the industry he acquired many ideas of his own about the efficient mining of coal and pioneered many new developments. One of the first to see the possibilities of strip mining, he believed the open face removal of coal was the best method for the Kansas field. After Mr. Spencer became associated with the Pittsburg & Midway Coal Mining Company, the firm began extensive strip mining operations which have increased throughout the years until the company is now one of the largest of its kind in the Middlewest, carrying on operations in Kansas, Missouri and Illinois.

Development of the mining company of which he had been the head for so many years, provides an intensely interesting story of industrial achievement. Opportunity always found Charles Spencer ready for action at the first knock. Mr. Spencer was also well-equipped with the qualities of vision, ambition, and hard work that were necessary to push his projects through.

Charles Spencer never lost his close touch with the industries he headed. He never forgot the days of his earlier years in coal mining, retaining his democratic manner at all times. Although large tasks constantly demanded his attention, he was approachable and accessible. He had a deep concern in public and civic affairs. While inevitably he thought of the effect of issues and policies on the industries to which he had devoted his lifetime, he always viewed such policies with respect to their effect on the nation. A man of calm conviction, Charles Spencer did not conceive it necessary for a man who believed in certain things to create a disturbance in expounding them. Neither did he believe in evading the expression of his views.

In the management of his own business, Mr. Spencer demanded efficiency and provided adequate equipment so that his men could achieve it.

Mr. Spencer served two terms as president of the Southwestern Interstate Coal Operators' Association and served as director of the National Coal Association for 20 years. He was second president of the Kansas Associated Industries and was a national concilor for the Chamber of Commerce of the United States. Mr. Spencer was also chairman of the board of directors for the military Chemical Works, Inc., of which his son, Kenneth A. Spencer of Kansas City, is president. This business organization is the prime contractor and operator of the Jayhawk Ordnance Works south of Pittsburg, Kansas. An active member of the Methodist Church, Mr. Spencer also held membership in the Masonic Blue Lodge and The Elks Lodge.

Married in Columbus, Kansas, on October 23, 1895, to Miss Clara Hughes, Mr. Spencer also leaves behind him three sons: Kenneth A. Spencer, president of the Military Chemical Works, Inc., and vice president and general manager of the Pittsburg & Midway Coal Company; Harold H. Spencer, president of Pioneer Coal Company and John Galen Spencer, of Pittsburg.

These are the facts of Charles Spencer's existence. Perhaps the most adequate description of his character is in the following excerpt from an editorial by the nationally famous Wm. Allen White, editor of "The Emporia Gazette."

"He was a statesman if ever Kansas had one, a man of vision who was not visionary, a man who could look into the future with a discerning eye and know what was there, what was coming, what should, in the nature of things, be expected with the development of man's knowledge of the material world.

"He was at the height of his usefulness. His place cannot be filled at once, for his kind is rare. His talents were exceptional. He was an executive of proven capacity and a prophet of real wisdom. Kansas could have spared any other man in all the state better than it could have spared Charles F. Spencer."

Shots from the FIRING LINE

Estimated Construction Volume for '43 Indicates 49% Decline

Construction contracts now indicated for 1943 should equal or better the volume of 1940, the latest year when peacetime activity was predominant. This is the opinion of F. W. Dodge Corporation, after careful review of current curtailment orders of WPB and of government estimates for 1943 activity. Such a volume would exceed somewhat the average annual volume of the twenty years 1920 through 1939.

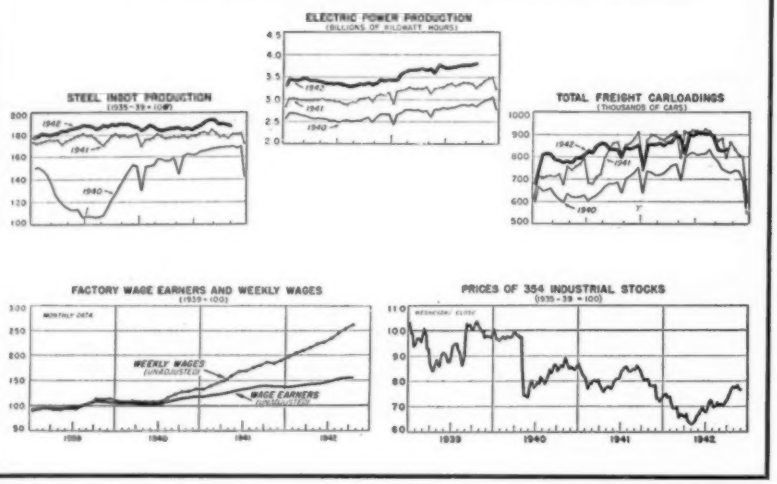
In a joint statement prepared by Thomas S. Holden, president, and Clyde Shute, assistant vice president, which has just been issued, F. W. Dodge Corporation estimates the total 1943 building and engineering contract volume for the 37 states east of the Rocky Mountains at $4,035,000,000, compared with an estimated $7,915,000,000 for the calendar year 1942. While the indicated decline is 49 per cent, it is pointed out that it will be a decline from this year's record volume of all time. Non-residential building volume is estimated to decline 53 per cent in dollar volume; the largest percentage decline in this general category is indicated for industrial buildings, but the estimated $900,000,000 for 1943 industrial construction is much larger than the volume of any peace-time year. Residential building is estimated to decline 44 per cent in dollar volume, and heavy engineering construction 47 per cent.

Commenting on these advance estimates, the statement says: "We believe these figures may safely be regarded as minimum figures. It is always the preference of F. W. Dodge Corporation in putting out advance estimates to err on the low side rather than on the high side. Furthermore, the estimates are being made at a time when all emphasis is being placed on curtailment of construction. It is quite conceivable that the process of curtailment may squeeze out projects which will later prove essential and may not fully provide for all the new needs that may arise during 1943. In particular, war housing needs are considerably greater than the figures shown in these estimates. While it is doubtful whether all the housing desired for in-migrant workers will be provided, there will be a constant pressure of new requirements demanding new allocations of materials for housing purposes. No relaxation of restrictions on non-war construction appears likely.

"In general, the number of very large projects (running into the tens of millions of dollars) is apt to be small in 1943, as compared with the numerous huge projects of 1941 and 1942. The bulk of the year's program will consist of moderate-sized projects; relatively few large industrial plants, cantonments, bases and supply depots; many new units added for expanding existing large projects."

• Construction view of a portion of the 6-mile highway and railroad underpass job that Utah completed in August, 1942. The $430,000 project was a part of strategic U. S. 40.

BUSINESS INDICATORS



Henry J. Kaiser Addresses Industrial War Congress

By Bethune Jones

Preparations now for the construction of "a vast, modern well unified, daringly designed and audaciously constructed highway system," the need for which "is already evident," are favored by Henry J. Kaiser, West Coast Shipbuilder, as part of an industrial planning program for the postwar period which "would restore the confidence of the people in industrial leadership."

His views were expressed in an address at the concluding dinner of the War Congress of American Industry, held December 2-4 in New York under auspices of the National Association of Manufacturers.

"Would the general contractors, the makers of road machinery, the manufacturers of cement and steel, and all of the manifold tools and materials that go into the building of highways,"

NO WAR, EVER BEFORE, SAW SHIPS BUILT IN 6 DAYS

...*nor* the modern *Preformed wire rope*

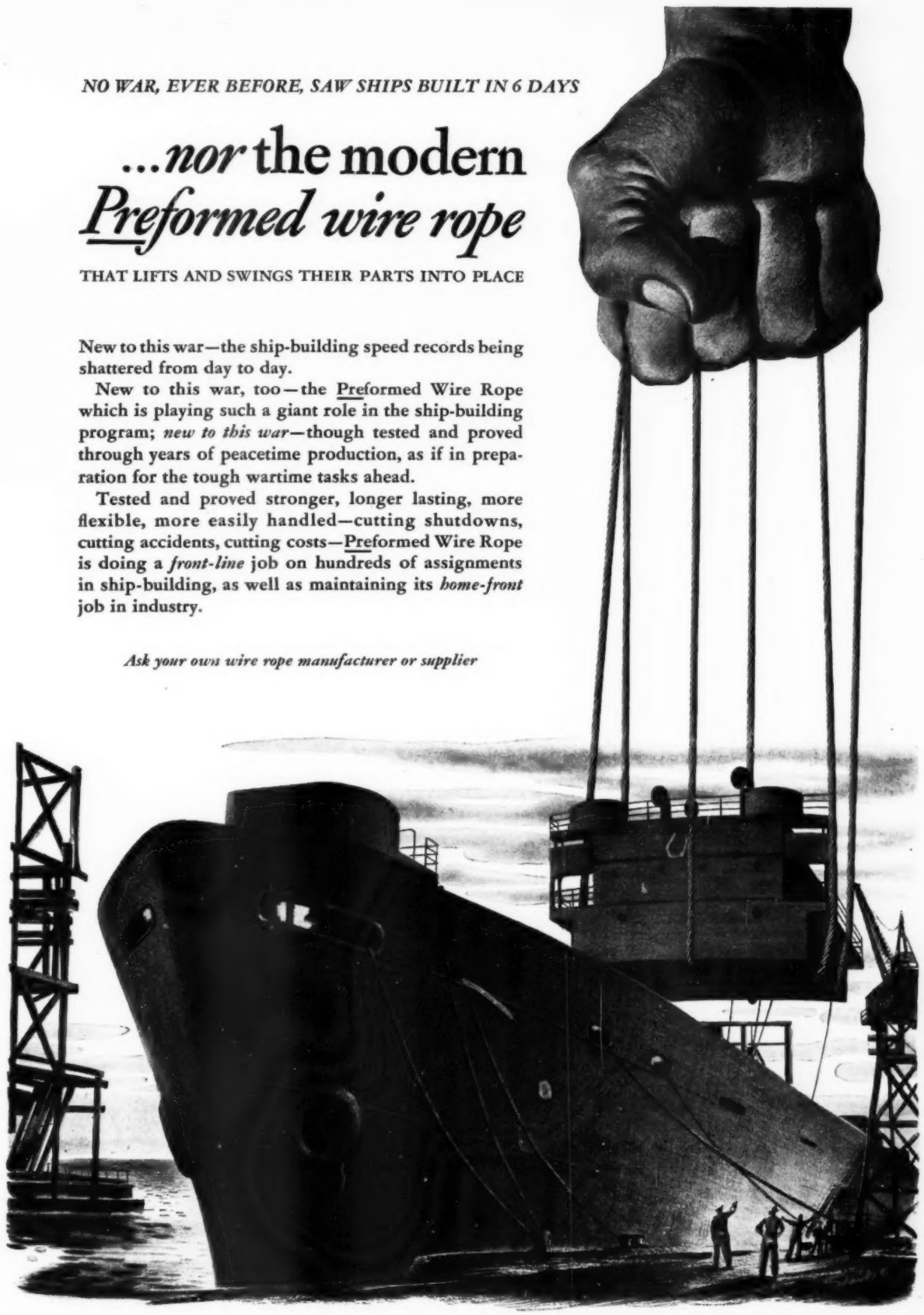
THAT LIFTS AND SWINGS THEIR PARTS INTO PLACE

New to this war—the ship-building speed records being shattered from day to day.

New to this war, too—the Preformed Wire Rope which is playing such a giant role in the ship-building program; *new to this war*—though tested and proved through years of peacetime production, as if in preparation for the tough wartime tasks ahead.

Tested and proved stronger, longer lasting, more flexible, more easily handled—cutting shutdowns, cutting accidents, cutting costs—Preformed Wire Rope is doing a *front-line* job on hundreds of assignments in ship-building, as well as maintaining its *home-front* job in industry.

Ask your own wire rope manufacturer or supplier



Kaiser asked, "organize now to design, plan, and finance a highway system that would be one vast extension of the great trunk which crosses Pennsylvania, the modern turnpike of speed and safety? Would the estimates be made with the help of the automobile industry and agencies already in existence, as to the volume of traffic that can be carried, and should be carried in order to quicken the movement of the great civilian army which now knows the automobile as an essential part of its daily existence?"

Calling for a postwar "plan to end all plans," Kaiser declared there need be no postwar depression if industry, in its various branches, undertook now to prepare a program of action after the war which "would vindicate and complement the astonishing record which industry is now establishing in war production."

"Does industry," he asked, "at this moment have the vigor and the vision to take the initiative? Will they fearlessly proclaim that every public work and every public service should be self-sustaining? Can they now assure the opportunities so that labor can continue to earn and to pay its own way; so that the tolls from the highways and the bridges will amortize their costs; so that the fees from organized medical centers will provide profits available, not only for extensions, improvements and research, but for the adequate compensation of competent medical service?"

"American industrial leadership has its challenge," Kaiser asserted. "It can surrender to the social politicians, who have little to offer save an ultimate bankruptcy, or it can win the greatest battle of its history by giving America the opportunity to work, and in due time by expanding that opportunity through our facilities, through our products, through our finance, into the far corners of the earth."

Noting that "some of our friends say that we should not divert our energies or thoughts to postwar problems at this time," Kaiser declared:

1942 INDEXES AVAILABLE

Complimentary copies of Excavating Engineer's 1942 Index are available to all who request them. Address your request to Excavating Engineer, South Milwaukee, Wisconsin, U. S. A.

"Since this is a war of survival, it is not surprising that we are admonished to devote our entire efforts to winning it. Such counsel, however, too often fails to reckon with the fact that man's deepest feelings, his human and spiritual longings, are an inseparable part of his best efforts and, therefore, he cannot be compelled to create war materials or to fight with war machines unless there is in him some great driving power which is perhaps best understood as 'Faith.'

"Our unspoken concern as to what we are fighting for, of necessity turns our faces toward the future. The problems of peace are already at hand, for in very truth they are inherent in the conflict. When the juggernaut of war comes to rest, it may be too late to know what we are fighting for. Therefore, now is the time to plan for peace since the kind of life that we will live, the opportunities that we will enjoy, the service that we will render, are what we are fighting for. It is a way of life."

State Highway Officials Make 1943 Plans

Elimination of federal motor vehicle use and gasoline taxes so that the states might impose equivalent levies to assure the adequacy of highway maintenance funds was urged in a resolution adopted by the American Association of State Highway Officials at the concluding session of its three-day annual convention, held December 7-9 at the Statler Hotel, St. Louis.

The resolution declared that state highway maintenance revenue is derived chiefly from taxes imposed on motor vehicles and fuels, that these revenues have declined greatly since gasoline rationing, and that it is necesary for state and local governments to have money to carry on highway maintenance and emergency construction during the war and to build up a reserve to defray the cost of postwar construction.

Another resolution called upon Congress to grant authority to spend present federal-aid highway funds for surveys and advance planning of postwar highway improvements and for early acquisition of rights-of-way for such improvements.

Other resolutions asked that Paul V. McNutt, as chairman of the War Manpower Commission, declare highway maintenance an essential industry, and that the War Production Board either grant higher priority ratings to materials essential to highway maintenance or establish a system of allocation of critical materials.

Brady Gentry, chairman of the Texas State Highway Commission, was elected president of the association, succeeding Michigan Highway Commissioner G. Donald Kennedy. T. C. Frame, chief engineer of the Pennsylvania Highway Department, was elected first vice president, and G. H. Henderson, chief of the roads and bridges divisions of the Rhode Island Department of Public Works, was reelected treasurer. Regional vice presidents named were: First district, H. A. MacDonald, Massachusetts; second district, J. A. Anderson, Virginia; third district, S. C. Hadden, Indiana, and fourth district, Robert A. Allen, Nevada.

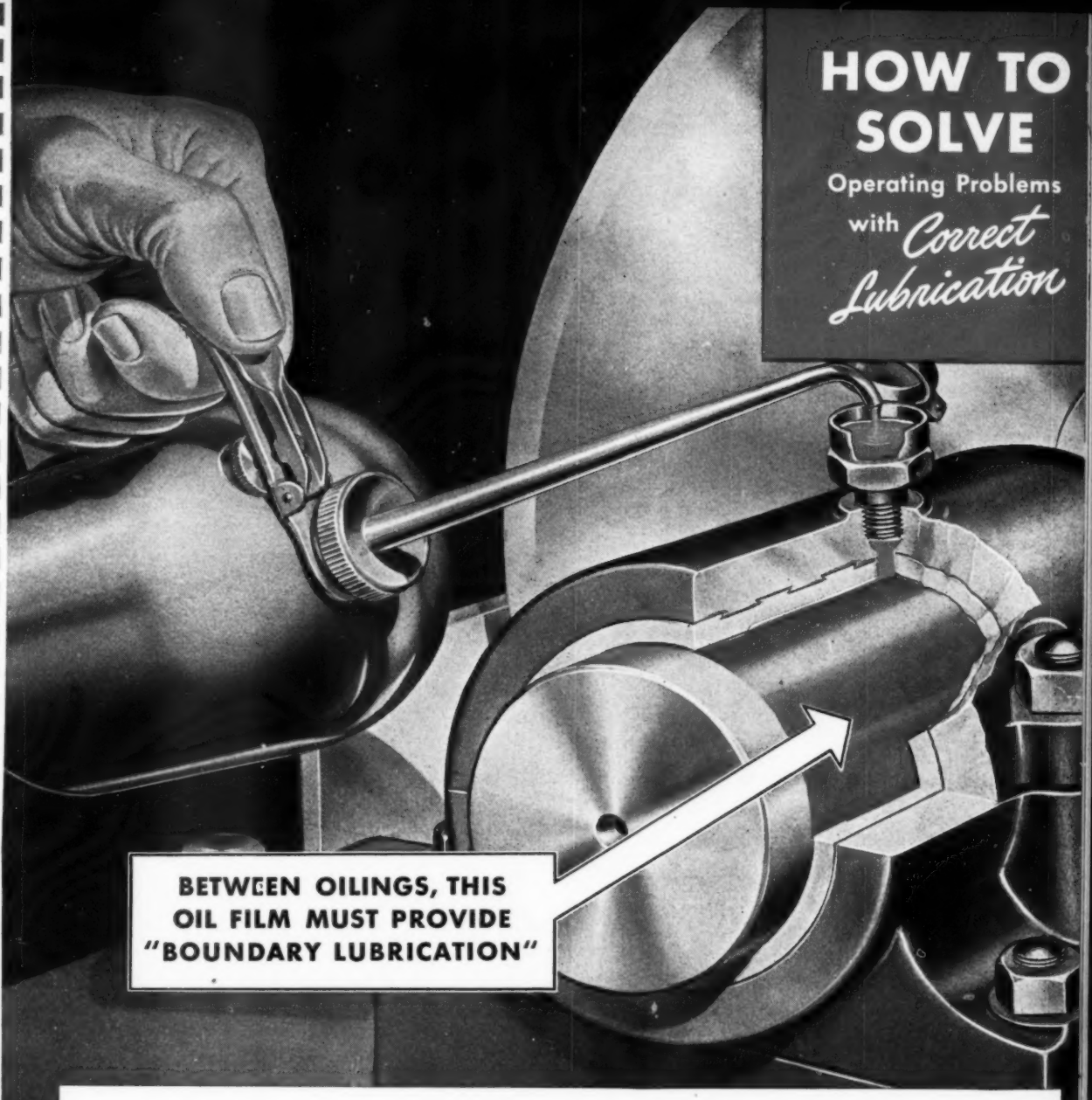
Principal speakers heard during the convention, which was attended by some 450 delegates, included Federal Works Agency Administrator Philip B. Fleming, who emphasized the importance of adequate planning for postwar public works.

"A great program of public works, federal and local, formulated under federal leadership," he declared, "is one of the major means available to maintain our national income, provide full employment and absorb the products of industry. Such a program is also indispensable to provide public works needed for the development of the nation. * * *

"Highways are the oldest and, in my opinion, still the most fundamental and necessary kind of public works. National unity, prosperity in peace and victory in war are largely dependent upon the adequacy of the transportation system. The Roman and Persian empires had long lives because of their excellent highways. Napoleon's victories were due in part to the highways he caused to be constructed, and yet

• Route 20 near Brimfield, Massachusetts, is a divided 4-lane highway with neatly graded shoulders and slopes.

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION



HOW TO SOLVE

Operating Problems with *Correct Lubrication*

Save Production Time Here!

PROBLEM: That red film of oil you see on the journal above is ample—at the time the bearing is oiled. But before the next application, the oil will drain off. Just a tissue-thin film — boundary lubrication — will remain. If you use ordinary mineral oil the film may not stand up. Metal-to-metal contacts between journal and bearing may result. Bearings fail. Important machines stop producing.

ANSWER: There is an oil specially made to meet this problem. It is called Gargoyle Vactra Oil. It has an extremely tenacious, persistent film that resists wiping action and rupture even when a film of microscopic thickness remains. Wear, temperature rise and power consumption are minimized with an extremely small supply of this oil. You are assured dependable operation and economy, too.

GARGOYLE Lubricants

SOCONY-VACUUM OIL COMPANY, INC.—Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. White Eagle Div. • Wadhams Div. • Southeastern Div. (Baltimore) • Magnolia Petroleum Co. • General Petroleum Corp.

CALL IN SOCONY-VACUUM

his ultimate downfall may have been partly due to the fact that his roads did not reach many of the areas in which he had to fight.

"Our highway system, rural and urban, still in great part designed in horse and buggy days, has lagged far behind the nation's needs. Relocation of population and industries, economic changes, the development of facilities for air transport, have made much of the system obsolete. Redesign and construction with regard to regional, state and local master plans, is necessary. Highways, of course, are not ends in themselves but means to ends. These ends are set out in such master plans. It is also clear that emphasis on the development of the federal-state highway system should be transferred from the country to cities, since it is in urban areas that congestion exists. * * *

"Many of the studies and plans which must precede the preparation of a comprehensive program are made or in process. A substantial part of the federal and local legislation necessary has been adopted. But additional legislation by Congress, state legislatures and city councils is desirable.

"In the Federal Works Agency we are giving much thought to the possibilities of further legislation to facilitate the preparation of a comprehensive program of federal and non-federal public works for education when and as Congress may determine. Power to cooperate with local programming agencies, we feel, should be included. We believe there is yet time to develop a program which will promote the conversion of the nation from war to peace with a minimum of shock, reduce the danger of economic collapse, aid in sustaining full employment and provide useful public works which will raise our standard of living and enhance the welfare of the people."

Carroll E. Mealey of New York, president of the American Association of Motor Vehicle Administrators, told the group that the fact that the federal government has assumed wartime control in many fields, including highways, should not lessen the vigilance in the future for the preservation of state sovereignty in the realm of the motor vehicle and highway administration.

Construction and maintenance of roads to military and naval reserves, war plans and sources of raw material is the principle wartime function of state highway departments, General C. P. Gross, Chief of Transportation, Office of Services of Supply, U. S. Army, declared in a paper read in his absence.

"In case of an invasion or air attack," General Gross said, "this network of roads will be of primary importance in providing for a speedy and orderly movement of the Army and of essential civilian traffic."

Construction of fight strips adjacent to public highways for use as auxiliary landing areas also is the responsibility of highway departments, he said, and and the national program will soon be extended to include flight strips for the Air Transport Command on the Alcan (Alaska-Canada) road and the Inter-American Highway between Mexico City and Panama.

Extension of the Alcan Highway, now completed from Dawson Creek, B. C., to Fairbanks, Alaska, with improvement of the present road to permit uninterrupted travel by all kinds of vehicles, might make possible the opening of an additional fighting front in Siberia, it was declared by Col. John W. Wheeler, Engineers Corps officer in charge of the road.

The stretch now in use is gravel surfaced, he said, and bridges are temporary to prevent serious losses when spring thaws occur. Since the rivers flow northward, they thaw at the mouth, and heavy floods are unavoidable until free outlet is provided for the upper reaches of water, he explained, with the result that travel probably will be interrupted for a time in the spring.

Highway Fund Diversion Reversal Suggested

Reversal of highway fund diversion practice, with states using general revenues where necessary to meet highway needs during the war as automotive tax yields shrink under rationing of tires, cars and gasoline, is suggested by the American Petroleum Industries Committee in its latest "Tax Economics Bulletin."

Commenting on possible offsets to reduced highway user revenue, the committee declares that "some of the states can support their highway needs by bolstering declining highway revenues with revenue from other sources which are bringing in larger returns. Many states have had unprecedented yields from non-highway user taxes such as sales, income, and miscellaneous taxes. Where necessary, it would appear advisable to use some of these general tax funds for highway purposes during the emergency. Such procedure would most certainly be in order in those states which have diverted highway user taxes to non-highway purposes. In these cases it would merely be a repayment of a long-overdue loan."

Another offset to declining highway revenue, the committee points out, will be forced curtailment of construction programs because of material and labor shortages. This will constitute a substantial saving, it is noted, since construction outlays have averaged almost half of state highway department expenditures.

Advocating continued reduction in the outstanding highway bonded indebtedness of the states, with any surplus highway funds being accumulated to accelerate this trend, the committee adds:

"With respect to highway debt the principal justification for adopting a conservative attitude lies in the need for the respective states to fortify their general financial position for postwar highway needs. By continuing without interruption the present trend toward reduction of highway debt, the states will be better able to launch highway construction programs which will be necessary in the immediate postwar period."

Indiana Road Men Convene

Outlining of a plan for averting "a complete disappearing act" during the war by the nation's general construction contractors, with their some 2,500,000 employes, featured the addresses given during the 19th annual meeting of Indiana Highway Constructors, Inc., held December 16-17 at the Claypool Hotel, Indianapolis.

"The construction contractor is headed for the discard unless he will be able to justify his existence in the war effort," it was declared by H. E. Foreman of Washington, managing director of the Associated General Contractors of America.

"Before so very long, all of the bridges, highways and airports that are needed in the United States for the prosecution of the war will have been built," he said. "Then, the construction contractor will have nothing to do. He will be forced to lay off all of his trained employes and to store much of his equipment."

To prevent such a situation, Foreman proposed a plan for "keeping alive" some of the general construction firms as a precaution against a day when enemy bombers, saboteurs, floods or earthquakes might damage or destroy large bridges, dams, city water systems, war industries, airports and other things vital to welfare of Americans and the war effort.

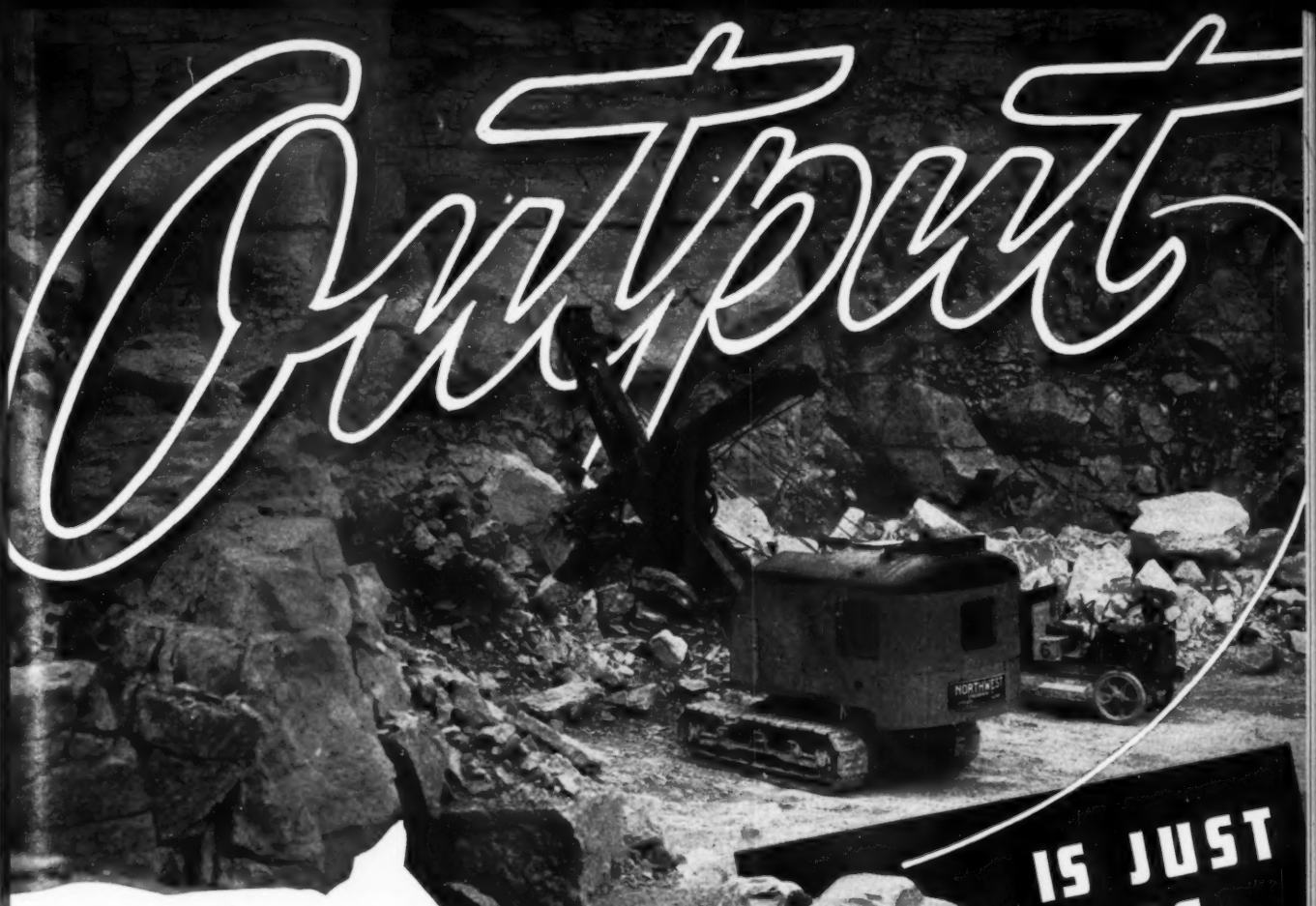
"Nearly every large industrial plant," he declared, "has a large staff of men whose only job is to make repairs to the factory building and to equipment. Why couldn't these men be assigned to other jobs in the factory, and their maintenance and repair work be taken over by construction contractors?"

Pointing out further that nearly every factory has a reserve supply of critical building and repair materials for use in emergencies, the speaker added:

"In view of the great shortage of certain materials, why couldn't all repair and building materials be turned over to construction contractors for use when and where they are needed? This may sound like a selfish plea in behalf of the contractors, but it should be remembered that in the past when bridges have been destroyed by floods, when city water systems have gone out of order and when similar emergencies have occurred, it has been the contractors with their trained workers and their equipment who have responded quickly and efficiently to calls for new construction work and repairs."

All officers of the association were reelected as follows: president, Robert H. Kink of Danville; vice president, John Dehner of Fort Wayne; secretary-treasurer, R. L. Schutt of Indianapolis, and executive secretary, W. M. Holland of Indianapolis.

Output



IS JUST AS IMPORTANT AT THE END OF THE DAY AS AT THE BEGINNING!

THE pressure is on us—it's on you for output. Any device that is going to enable you to get ore to the mill in bigger quantities, faster, means something to you and to the country.

Northwest realized long ago that hard operation reduced a machine's output as the day progressed—and the result was the "feather-touch" Clutch Control. This device turns the power of the engine to actuate the heavy drum clutches. It is purely mechanical. There is nothing to leak, no high pressure lines, no complicated adjustments, it is unaffected by weather,—just a simple band mechanism so sensitive that the feel of the bucket is always present. Release is positive and if desired it can be disconnected so there is no possibility of shut down due to failure of controls.

The "feather-touch" Control reduces operator fatigue and permits the maintenance of high output *all day long.*

NORTHWEST ENGINEERING COMPANY
1750 Steger Building, 28 East Jackson Boulevard, Chicago, Illinois

It's a real hard rock miner!

NORTHWEST

NOT in the Contract

An American soldier in England was giving some illustrations of the size of his country. "You can board a train in Texas at dawn and 24 hours later you'll still be in Texas."

"Yes," said one of his listeners, "we have trains like that here, too."

"Rastus says Pahson Brown done ketch him in Farmer Smith's hen coop."

"Mm-m boy! Did Rastus done feel 'shamed?"

"Nossuh. De pahson am de one to feel 'shamed. He kain't 'splain how he done ketch Rastus dar."

"I read in a book that Apollo was chasing a nymph and she turned into a tree."

"He was lucky. Those I chase always turn into a night club or a restaurant."

Give some chorus girls an inch and they've got a costume.

"Now," she asked, "is there any man in the audience who would let his wife be slandered and say nothing? If so, stand up."

A meek little man rose to his feet. The lecturer glared at him. "Do you mean to say you let your wife be slandered and say nothing?" she cried.

"Oh, I'm sorry," he said, "I thought you said slaughtered."

Manager: "Last night there was a fire in the dressing room of the leading lady. The firemen were there six hours."

Reporter: "Six hours to put out a fire in a dressing room?"

Manager: "No, oh no—it only took one hour to put out the fire, but it took five hours to put out the firemen."

"Snodgrass spends all of his lunch hours trying to reduce!"

Smart Indian!

One day an Indian called at the office of a senator to urge passage of a bill authorizing the tribe to allot their land in severalty. But the senator objected on the grounds that Indians were not sufficiently intelligent.

"Why, Senator," protested the Indian, "do you mean I haven't enough sense to manage my own business?"

"No, certainly not," replied the Senator. "I was only thinking of the average Indian."

"Senator," said the Red Man, "I am an average Indian."

"Oh no," countered the Senator, "the Indians wouldn't send just an average man to represent them before Congress. They would send the smartest man they had."

"My dear Senator," said the Indian very patiently, "you are quite mistaken. Indians are just like white men. They **never** send their smartest men to Congress."

A clergyman and a Scotchman were watching a baseball game together. The Scotchman continually took nips from a bottle, and the clergyman, no longer able to restrain himself, at last cried out, "Sir, I'm sixty-nine years old, and never in my life have I touched alcohol."

"Well, dinnae worry yourself tae much," replied the Scotchman with a pronounced burr, "you're nae ginna start noo."

A gentleman slipped on the stair of a subway and started to slide down to the bottom. Halfway down he collided with a lady, knocking her down, and the two continued their way together.

After they had reached the bottom, the lady, still dazed, continued to sit on the gentleman's chest. Looking up at her he said politely:

"I'm sorry, madam, but this is as far as I go."

The demure young bride, her face a mask of winsome innocence, slowly walked down the aisle clinging to the arm of her father. As she reached the platform before the altar, her dainty foot brushed a potted flower, upsetting it. She looked at the dirt gravely, then raised her large childlike eyes to the minister and said, "That's a hell of a place to put a lily."

6-DH-691 Buda Diesel powers this dragline, feeding the crusher at the Vanaken Sand & Gravel Company plant near Portland, Ore.

Step Up Wartime Output

Assure Lower Peacetime Costs

with BUDA *Diesel Power!*

THRIFTY, reliable BUDA Diesel power is a steady helper to the man who must get the *most* out of precious labor, equipment and time today. And, because long trouble-free life is designed and built into every part, these rugged engines will be contributing their cost-cutting performance to the competitive peacetime days ahead.

Steady, low-cost power for the Southeastern Portland Lumber Mills' crusher is provided by this husky 6-DH-691 Buda Diesel, at work in Mt. Hood Park

Those who can't afford to waste time or fuel —who want to invest in power that *lasts*— are turning to BUDA. Hundreds of BUDA Diesels are now at work on:

Shovels	**Crushers**	**Carry Scrapers**
Trucks	**Washing Plants**	**Draglines**
Locomotives	**Conveyors**	**Generators**
Pumps	**Drills**	**Compressors**

Write for complete information on the BUDA line of Diesel, gasoline, natural gas and butane engines—from 20 to 250 hp.

BUDA
.. for MORE HORSEPOWER HOURS per DOLLAR

THE BUDA COMPANY

HARVEY (Chicago Suburb) ILLINOIS

GASOLINE and DIESEL ENGINES—15 to 250 H. P.

Electric Maintenance

(Continued from page 21)

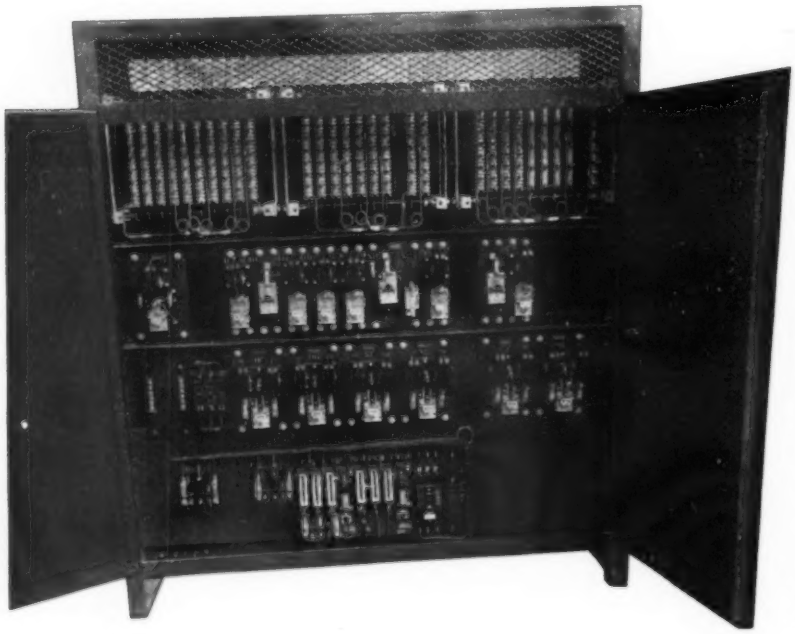
Thermal over-load (over-current) relays are quite often used in combination with magnetic switches and the relays should be manually operated occasionally. There is no other way to know that a relay which hasn't been required to trip out for months will trip out when needed next week. However, since these relays are made of relatively small parts and can be damaged easily, they should be handled carefully.

Air circuit breakers, such as the De-ion switch, and fuses are used also for over current protection, but there isn't much to inspect except to see that the air circuit breaker operates freely and that the fuse makes good electrical contact with the fuse holder. All of these protective devices are installed for a purpose and that is to protect the apparatus from immediate harm. From the maintenance man's point of view they also have the more important function of warning that the electrical conditions in that particular circuit are not as they should be and therefore, require investigation.

Drum switches, master switches and pilot switches require regular inspection. Switches being operated continuously and those handling high current will need the most frequent inspection. Contact making surfaces of drum switches, particularly the segments, will need cleaning and dressing to assure steady operation of the excavating machine. A light coating of petroleum jelly on the segments will help prevent roughness and scoring, and will not affect appreciably the contact resistance. Mechanical parts of drum switches need inspection, too, as bearings, pins and gears wear and when lost motion or back-lash becomes too great, false operation of the electrical contacts may result. Master switches require much less frequent servicing than drum switches and the mechanical parts are more likely to require attention than the electrical contacts.

Master switches on excavators imply the use of DC contactors and they usually are a sturdier type of contactor than the ones operated on AC. However, the DC contactors must be examined frequently for freedom of movement, burned contact tips and loose connections. The interlocks are important to the efficient operation of the excavator as some safety features depend on their proper contact.

Resistors may be of the cast grid type, or wire wound type. The cast grid type is held together by rod bolts, so that the contact resistance between individual grids is dependent on the quality of the contact surfaces, and on adequate pressure to keep them together. If a contact surface starts pitting it can be taken care of by jumpering that contact only, or sometimes by inserting a thin copper washer. Broken grids can be detected by critical examination, by testing, or by watching the operation of the machine. Terminal lugs on resistors are usually of the clamping type and these should be inspected to be sure that the lead is being held securely. The clamping action of the terminal lugs is more likely to become loose with stranded wire than with solid wire. The wire wound type of resistor, used extensively on excavating machines with Ward Leonard control, needs inspection to determine if the terminals have become loose, or if the wire is broken. Corrosive atmosphere after a long period may affect the resistance value and current carrying capacity of the resistor, and testing is the only practical way to evaluate that. The testing of the combination of master switch DC contactors and resistors is of a rather special nature and the excavator manufacturer should be consulted for test procedure and for possible changes or corrections in the resistor.

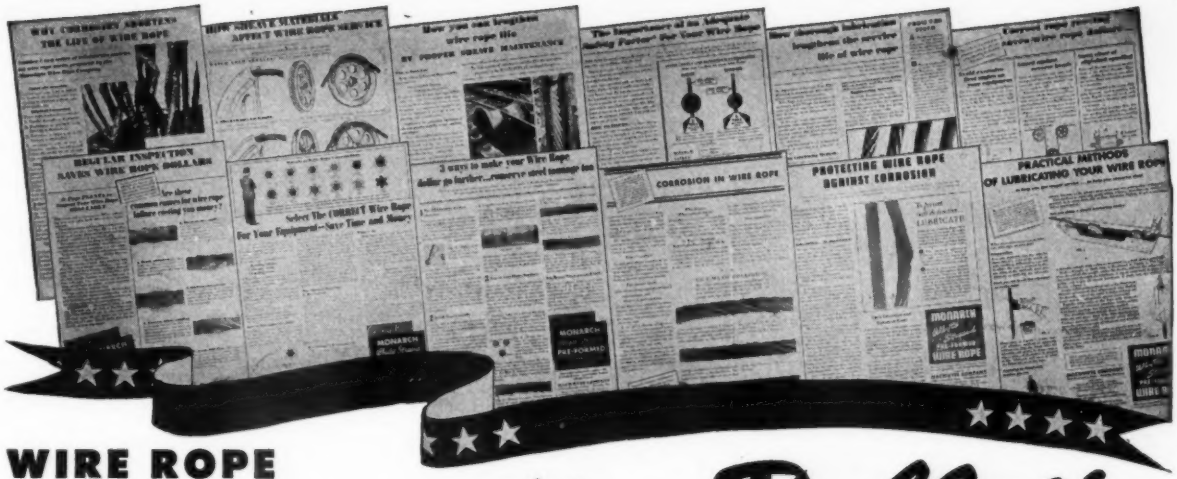


• Contactors and resistors form the nerve center of an electric excavator. This switchboard should always be kept in good condition.

There are numerous other electrical items used on excavating machines, these include such equipment as transformers, solenoid brakes, magnet valves, lifting magnets, push buttons, limit switches, meters and instruments. A knowledge of the care of items previously mentioned should be sufficient for the maintenance of these.

Lighting Equipment Maintenance

Lighting equipment on your excavator involves a few other electrical items such as lamps and flood light projectors and reflec-



WIRE ROPE *Conservation Bulletins* SENT ON REQUEST

We pause in this series of informative articles for wire rope users to review briefly the 12 thus far published . . . and provide an opportunity for those who may not have seen them to obtain reprints.

The purpose of this series of single-page illustrated articles on wire rope conservation is to help you conserve your wire ropes. This helps you, and helps our country for it means conservation of steel. We shall be glad to send you any or all of the articles listed below which readers tell us are useful and helpful.

1 ***Why Corrosion Shortens the Life of Wire Rope.*** Tells cause, effect, and suggests remedy for corrosion. Also explains how proper lubrication helps wire rope stand up against elements.

2 ***How Sheave Materials Affect Wire Rope Service.*** Pictures effect of hard and soft sheaves on wire rope. Explains what to watch for, how to avoid rope and sheave damage.

3 ***How You Can Lengthen Wire Rope Life by Proper Sheave Maintenance.*** Includes handy reference table on groove tolerances. Also points out 3 ways to save wire rope dollars.

4 ***The Importance of an Adequate Safety Factor.*** What is it? How Found? When is wire rope overloaded? What are minimum safety factors for various loads? All are answered in this easy-to-read, informative article.

5 ***How Thorough Lubrication Lengthens Service Life of Wire Rope.*** Explains two lubricating methods. Shows effect (Pictures) of ropes left unprotected.

6 ***Correct Rope Reeving Saves Wire Rope Dollars.*** Discusses fleet angles, reverse bends, rope spooling and what to do about them.

7 ***Regular Inspection Saves Wire Rope Dollars.*** Lists 6 common causes of wire rope failure. All can be avoided if rope user follows simple inspection procedure suggested.

8 ***Select the Correct Wire Rope for Your Equipment—Save Time and Money.*** Explains how Flexibility, Abrasion Resistance, and Strength are determined to meet varying conditions of Bending Fatigue, Abrasive Wear, and Loading Stress.

9 ***3 Ways to Make Your Wire Rope Dollar Go Farther—Conserve Steel Tonnage Too.*** Especially valuable to men actually handling wire rope.

10 ***Corrosion in Wire Rope.*** Gives further information on how to combat this rope destroyer. Supplements informative article number 1.

11 ***Protecting Wire Rope Against Corrosion.*** Shows some results of forgetting to inspect and protect wire rope with proper lubrication.

12 ***Practical Methods of Lubricating Your Wire Rope.*** Illustrates simple ways to lubricate your wire rope on the job. Very practical, useful for everyone concerned with wire rope care.

MACWHYTE COMPANY Manufactures:

- MACWHYTE PREformed and Internally Lubricated Wire Rope
- MONARCH WHYTE STRAND Wire Rope
- MACWHYTE Special Traction Elevator Cable
- MACWHYTE Braided Wire Rope Slings
- MACWHYTE Aircraft Cables and Tie Rods

MACWHYTE COMPANY, 2903 Fourteenth Ave., Kenosha, Wis. • *Mill Depots:* New York • Pittsburgh Chicago • Ft. Worth • Portland • Seattle • San Francisco • *Distributors throughout the U. S. A.*

NO. 646

How to get them

Just circle those you wish and attach coupon to, or write on, your business letterhead.

"Awarded for outstanding achievement to the men and women of Macwhyte Company."

Macwhyte Company
2903 Fourteenth Ave.
Kenosha, Wisconsin

1 2 3 4 5 6
7 8 9 10 11 12

I would like reprints of informative articles on wire rope conservation which you have published recently. I have circled those I wish.

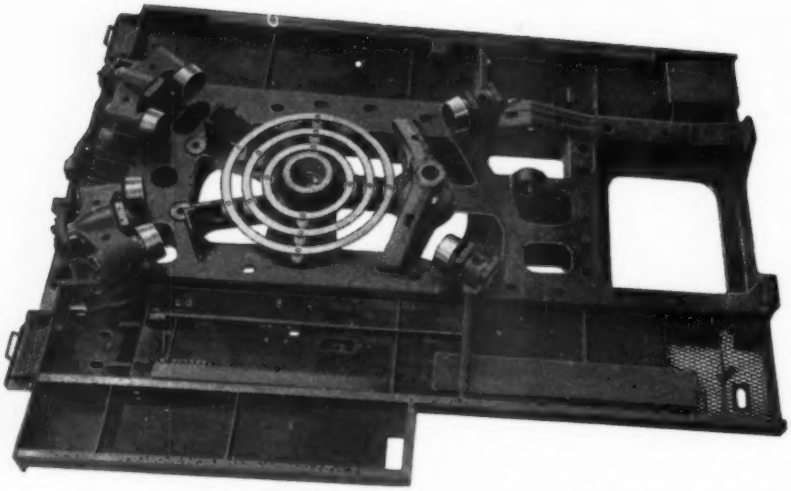
*Name*_____

*Title*_____

*Company*_____

*Co. Address*_____

*City*_____ *State*_____



• Collector rings at the centerline of rotation of an excavating machine must be kept clean and should be watched for wear on the sliding shoes or fingers. Petroleum jelly on the rings will prevent excessive wear.

tors. Shortened lamp life caused by high voltage, can be overcome by selecting replacement lamps with a higher voltage rating such as 125 volt instead of 115. Excessive vibration is another cause of short life and shock absorbing fittings can minimize that. Floodlights and reflectors need to be kept clean to maintain their efficiency and metal reflecting surfaces which are subject to tarnishing should be protected as much as practical to make polishing less frequent.

Collector rings at the centerline of rotation of an excavating machine must be kept clean and should be watched for wear on the sliding shoes or fingers. Accumulation of oil and dust on the insulating supports may form a conducting path, and if high voltage is used the leakage to ground may be dangerous to personnel in addition to damaging collector ring parts. Petroleum jelly on the rings will prevent excessive wear without affecting appreciably the contact resistance.

Electric trail cables need frequent inspection and testing. While testing equipment may seem to be a luxury it will pay big dividends by detecting damage not noticeable by visual inspection, thereby forestalling a major shutdown, and also maintaining the safety features which are so important to the personnel. Precautions against damage are, of course, much better than repairing a cable after damage has been done. However, unless tests are made, the electrician cannot always be sure of what precautions are necessary. Rubber material such as splicing compound is becoming increasingly difficult to obtain, and it is all the more important that the grade of rubber available be used to best advantage and the workmanship on the splices be as good as possible. Splicing of a cable, after cutting out the damaged section, should be done with the aid of a vulcanizing outfit and preferably done in a shop where working conditions are much more favorable. Ground wires and shielding on the conductors should be carried through a splice as near as possible to the manner in which the cable originally was constructed. Observe as many of the following cable precautions as is practical: avoid sharp bends, avoid twisting the cable, prevent trucks from running over the cable, protect from strong sunlight, and protect from excessive heating caused by winding too much cable on a reel.

Schley Mine

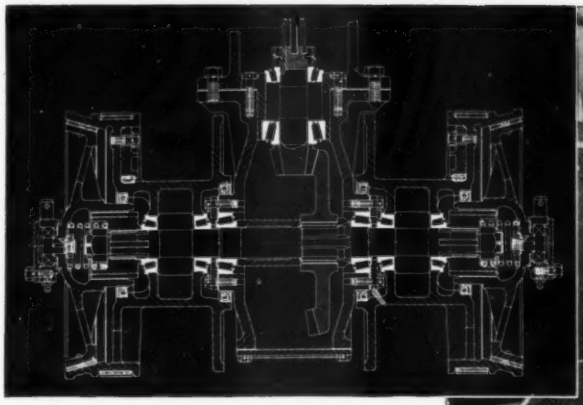
(*Continued from page 23*)

A Bucyrus-Erie gasoline-powered 27-T blast hole drill is kept busy at the Schley mine putting down 6-inch holes for the major blasts. Averaging 15 feet in depth, about 20 holes are shot per blast. Occasional "snake holes" are also shot as needed. These 6-inch holes, averaging 20 feet in depth and running to a maximum depth of 40 feet, are placed by a Parmanco horizontal drill. DuPont powder is used for all blasting works.

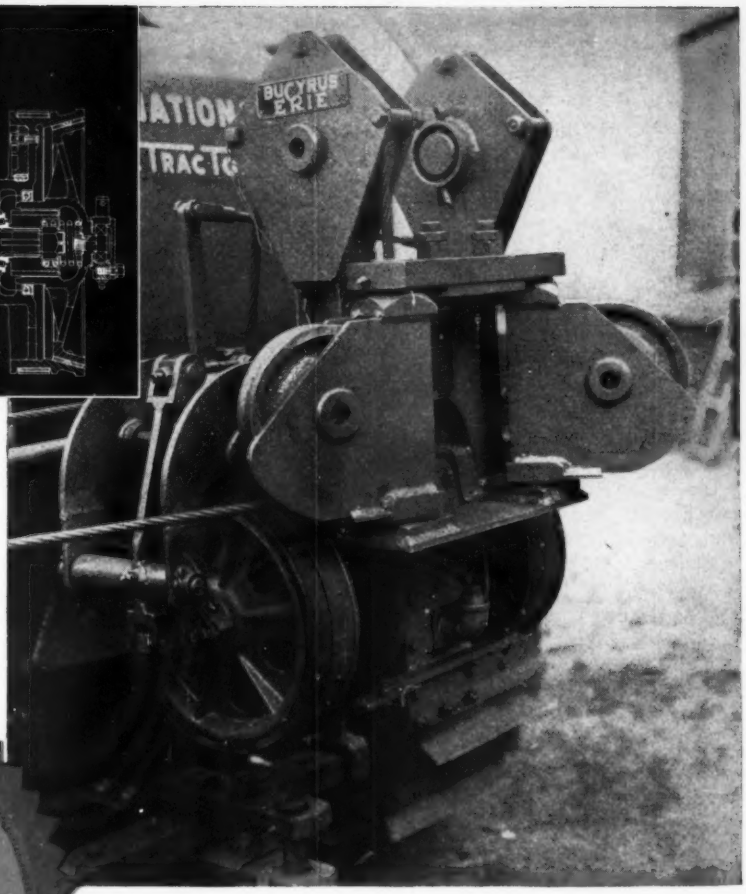
Draining Old Mine Shafts

The presence, in the pit area, of all underground shafts from the early operations of the Republic Iron and Steel Company has resulted in a serious drainage problem. Since these shafts serve as a natural run-off for the water

• This old underground mine head frame serves as the fountain head of the 660-foot conveyor system at the Schley mine.



Application of Timken Bearings on drum shaft and pinion shaft of Bucyrus-Erie C22 Power Control Unit.



Bucyrus-Erie No. C22 Power Control Unit for tractors equipped with Timken Bearings on drum shaft and pinion shaft.

Keep your machines driving harder for Victory; equip them with more Timken Bearings. Redesign now—then you'll also be prepared for post-victory conditions, be what they may.

HELP ASSURE VICTORY

Buy War Bonds. Conserve Rubber. Eliminate Unnecessary Travel. Use the Telephone Only When Important. Salvage All Scrap and Waste Material.

All Timken Bearing production now goes into fighting machines. However, the Timken Bearings in your motor vehicles or industrial machines will see you through the emergency—and beyond it—if you make sure they are lubricated and inspected regularly.

Partially Timken Bearing Equipped machines will out-perform similar machines not so equipped. To give your equipment the complete protection it needs however—(against friction; wear; radial, thrust and combined loads; and misalignment of moving parts) Timken Tapered Roller Bearings should be used at every suitable position.

Machine designers who use Timken Bearings not only are giving their employers *better* machines but also *better selling* machines; for the trade-mark "TIMKEN" is accepted as a sign of superiority by buyers everywhere.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

"All There Is In Bearings"

table of the surrounding countryside, constant pumping is the only means of keeping the water level below the pit floor. During early operations a pump flow of 10,000 gpm was necessary. Currently the flow runs about 7,000 gpm. This pumping job is being handled by two deep well pumps, one a 350 hp Layne, the other a 250 hp Peerless serving as a standby unit.

As an added precaution, daily observation of the water level is maintained by checking the level in old underground mines nearby. By this method, pumping operations are kept well ahead of pit excavating activities.

Now that the operating problems are solved, let's turn to the most essential part of this operation—that of loading out merch ore for the blast furnaces of Uncle Sam's war production plants. Ore hauled to the pit end of the conveyor tunnel is dumped into a 15-inch grizzly feeding a 6-inch vibrating screen. Plus 6-inch material is crushed by a 24x36 crusher and rejoins the balance of the ore on its way up the 660-foot conveyor system to the old underground mine's head frame where the ore is dumped directly into cars bound for the shores of Lake Superior. About 135 of these cars, averaging a capacity of 46 tons each, are included in each train.

Since this merch ore is dumped directly into the holds of Great Lakes freighters, each train load must be tested to assure that the ore is running true to the requirements of the steel company buying the ore. In making this test, a sampler stretches a cord, knotted at 2-foot intervals, diagonally across the filled car. Samples of the ore are removed at each knot with a small scoop and placed in a cloth bag along with an identification slip. These samples are promptly sent to a firm in the range that specializes in ore analysis and supervises the entire sampling process.

Auxiliary Loading Platform

As an emergency standby in the event of a breakdown of the conveyor system, the Schley mine also has an auxiliary loading platform to which the trucks can haul to from the pit, dumping directly to the ore cars. This platform also comes in handy for occasional selective purchases of ore by various companies. Using the platform the desired type of ore can be trucked direct from the pit to a specified ore car. Since the rail siding is on a slight grade, ore cars are gravity spotted at the head frame as well as at the auxiliary platform.

Lean ore being removed from the Schley mine is set aside in stock piles for the day when improved methods of ore beneficiation will make possible the use of this material. Waste material from the mine is used for road surfacing where needed.

Equipment maintenance plays an important part in the daily operation of the Schley mine and under the guidance of Loyd Mihm, master mechanic, a crew of eight men are kept busy servicing operating equipment. Lubricating and fueling operations are carried on during the night shift, and the day shift is spent in general maintenance and repair work. Dipper tooth points are renewed by welding a section of manganal wedge bar to the blunt tooth. The tooth is then further reinforced along all of its corner edges with beads of "Abrasoweld" hard surface rod. A Lincoln portable arc welder is used for this as well as other welding work.

North Range Mining Company's activities are headed by R. S. Archibald, president and general manager, and C. W. Nicolson, assistant manager. The E. W. Coons Company, operating agents of the Schley mine, is supervised by W. C. Cohoe, president, and Walter E. Wilson, vice-president. R. A. MacDonell is the company's superintendent of mines.

• R. A. MacDonell, superintendent of mines for E. W. Coons Company, is supervising the development and production of the Schley mine.

• This general view of the Schley mine, taken in April, 1941, shows Nieniber & Pettyjohn's two 1½-yard Lima shovels at work during early stripping operations. Note, in the background, the underground mine head frame that later became a part of the conveyor system.

Increasing Output

(*Continued from page 26*)

is doing lots of jobs today no one thought they could a few years ago.

Where a large number of hauling units is being used, it may be well worth while to set up a definite plan for getting them started in the morning and after lunch. For example, one contractor numbers his trucks and always starts them in order, staggering the lunch period of the drivers so that trucks arrive under the shovel at the start of each operating period at definite time intervals. Trucks are fueled just before starting, and the schedule is so timed that there isn't an idle moment for shovel operator or any of the truck drivers.

C. Saving Time at the Shovel

There are any number of little things that can be done at the digging "end" of the job to speed up operations and spare the equipment at the same time. Here are a few to watch for:

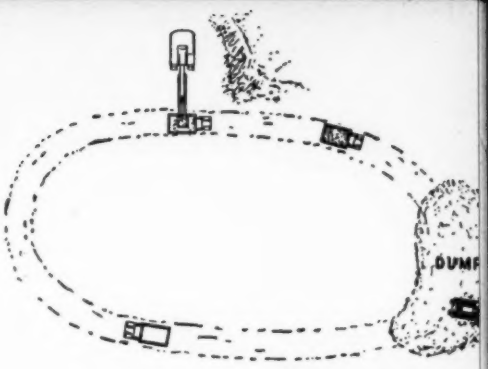
1—Dig as close to the bank as is consistent with safety.—Digging with an extended handle wastes power and increases time needed to swing and dump. If you'll watch a shovel working close to the bank, you'll soon see how leverage operates to give the most effective digging action. This means faster filling of the dipper, fuller loads every pass, less time spent crowding, and less horsepower used per yard of dirt loaded. Both power consumption and wear on the engine are reduced when each horsepower unit is most effectively used.

2—Move up when there is a momentary wait for trucks. Even where trucks are arriving regularly, a skillful operator can plan his moves to delay actual loading a minimum. For instance, he can move while the truck spotter is getting the first trucks properly lined up in the new position.

3—When you are digging anything but a freely flowing bank, **use the open dipper to loosen material** whenever there is a momentary wait for trucks.

4—Be sure the shovel cleans up the pit as it goes. Back-tracking to clean up is inefficient, and a messy pit can be hard on hauling equipment. Never "sweep the pit" by brushing with a sideways dipper motion. The resultant stresses put in the machine will soon show up on the maintenance sheets. A shovel dipper handle and boom are not designed to take sideways stresses, except those imposed by swinging.

5—Get a full dipper every pass. —If dipper teeth are kept sharp and if a relatively thin cut is taken, it's easy to fill the dipper. Do not overcrowd; it isn't necessary in order to get a full load, and it slows down the cycle as well as being hard on the machinery. Take just enough of a cut to fill the dipper and then retract. This will cut clean-up to a minimum. It the bank is high, take top passes first. Watch the work, and if the back of the dipper isn't filling regularly, try to adjust crowding and dipper pitch to eliminate voids.



• **Jobs laid out with a circular haul avoid a lot of operating headaches right at the start. Ease of spotting and avoidance of cross traffic are two good reasons for employing this haul whenever possible.**

6—Don't start swing until dipper has been hoisted or retracted free of bank. Dragging the dipper across the bank cuts speed and increases wear.

7—Always work for a balanced cycle. Crowd, hoist, swing, dump, and return should be blended into a smooth digging cycle. If the operator can set a regular rhythm he won't get tired; output will be big at the end of the shift as well as at the beginning. Jerky operating may look fast, but it's hard on man and machine, and it doesn't add up to real yardage over any extended period.

8—Wherever possible lay out the work so natural drainage keeps the shovel working on dry footing.

While this discussion has been principally limited to one relatively simple type of shovel job, the general principles are true for any digging job. Too much stress cannot be laid on proper lubrication, a subject which will be discussed fully in a forthcoming Excavating Engineer article. Good lubrication, more than any other single thing, can keep your equipment going for the duration.

To summarize, study time and motion on all your jobs with a view to eliminating any unessential steps. Saved seconds have never been more important; to you, and to your country.

• **This shovel is working with an over-extended dipper stick. Note how this inefficient position causes unnecessary strain between the crowd and hoist actions.**

FAST DIGGING . . . H

Bucyrus-Erie 4-WHEEL SCRAPERS

Bucyrus-Erie 4-Wheel Scrapers are definitely faster and easier to load. That's one of the important reasons for their phenomenal output on vital war dirt-moving jobs . . . it's one of the reasons they can stand the punishment of staying on those jobs three shifts a day week after week without giving in.

TEAM WITH THE TRACTOR — Bucyrus-Erie Scrapers are carefully proportioned relative to the size tractor with which they are used. This is extremely important in obtaining full loads because a scraper that is too wide offers too much resistance to the pull of the tractor; a bowl that is too long will not fill properly at the rear.

LOAD BOTH APRON AND BOWL — The cutting edge is located at a point between front and rear wheels where it loads both bowl and apron — assures full loads every time. Sides of bowl carrying frame extend ahead of cutting edge to prevent side spillage.

DIRT "BOILS" FOR EASY LOADING — The double-curve cutting edge (curved both vertically and horizontally) boils the dirt upward, just as the moldboard on a plow does. The rolling dirt enters in a vertical column, rises up through the load, rolls out on top and falls over into both apron and bowl.

SHORT DISTANCE LOADING — MINIMUM DRAWBAR PULL — Loading is accomplished in short distances because the last dirt entering the bowl doesn't have to push and pack the whole load in order to get in . . . therefore less tractor power is required.

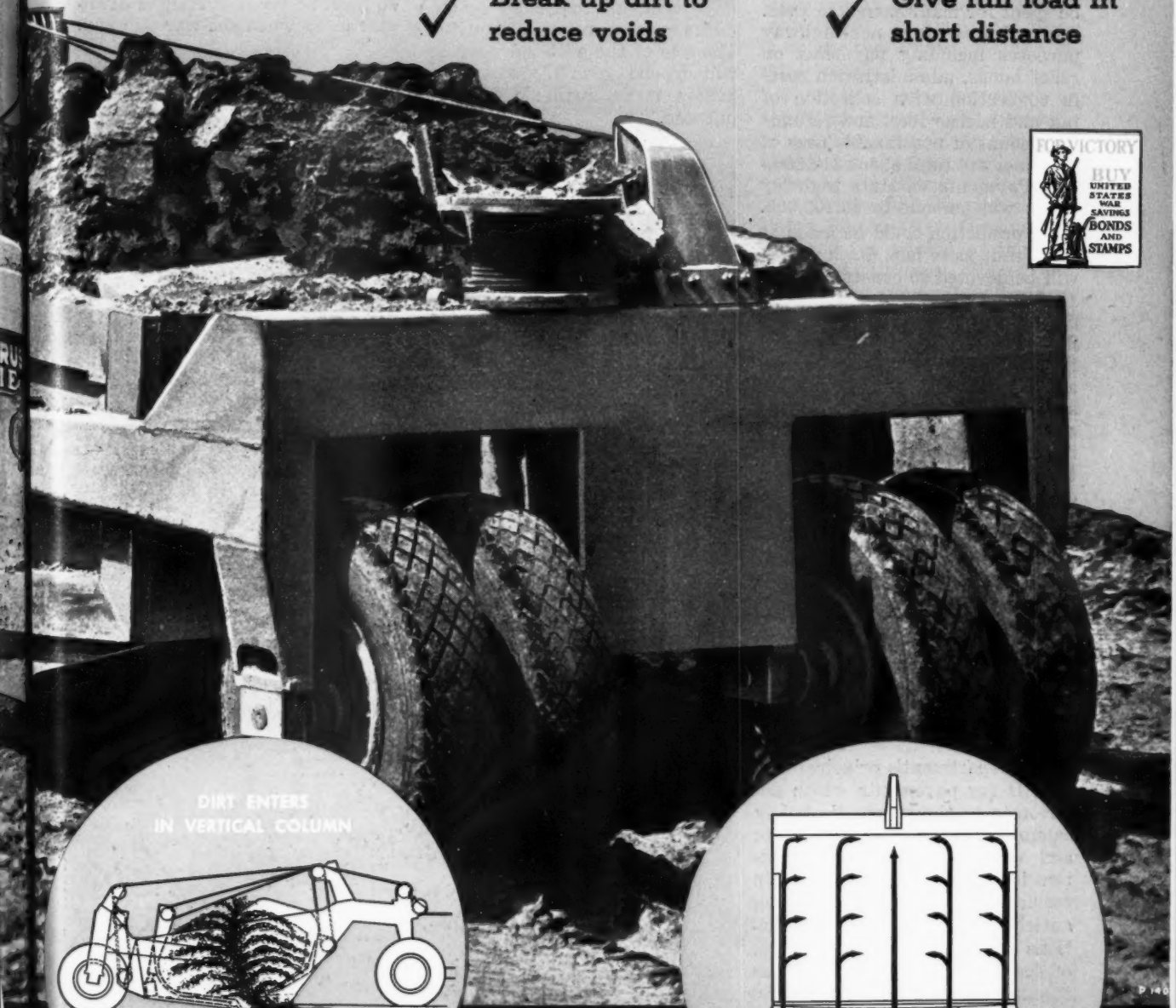
BREAK UP DIRT — The "boiling" action agitates the dirt and breaks up the lumps to reduce voids and give full loads. This broken-up dirt also rolls out quickly and easily when dumping.

for BUCYRUS ERIE EQUIPMENT

SEE YOUR INTERNN

PING "VICTORY" LOADS

- ✓ **Boil dirt into bowl for easy loading**
- ✓ **Require minimum drawbar pull**
- ✓ **Break up dirt to reduce voids**
- ✓ **Give full load in short distance**



DIRT ENTERS IN VERTICAL COLUMN

This diagram of the "boiling" action shows how the dirt flows evenly into both apron and bowl by the shortest possible route.

FLAT CUTTING EDGE

A non-curve flat-type cutting edge is also available for Bucyrus-Erie Scrapers if you want it.

Horizontal curve gives "pointed" penetration and directs dirt to center of bowl, reducing sidewall friction

NAL TRACTRACTOR DISTRIBUTOR

State-by-State Forecast

(Continued from page 17)

obligated by contract. How much of this amount can be assigned to construction in 1943 must depend upon the extent to which federal agencies certify the defense importance of projects in the state.

About $7,500,000 is expected to be spent for maintenance in 1943. Expenditures for non-highway purposes including payments on relief bonds, administration costs in connection with collection of tax and license fees, and refunds on account of non-taxable uses of gasoline, will total about $12,800,000. Payments on state highway bonds will amount to $9,200,000.

No prediction could be made at press time as to how much money will be devoted to construction in 1943. However, the state highway department feels reasonably confident of its ability to maintain its highway system about as well as in the past despite possible shortages of labor, materials and equipment. To achieve this, it may be necessary to omit some of the usual refinements and to scale down operations somewhat by considering the anticipated decrease in traffic and reduction in driving speed. It is believed that the system as a whole will continue to give satisfactory service.

An extensive pavement patching and reservation program was undertaken in 1942 with the aim of keeping the highways in service for the duration with normal maintenance.

The department's principal concern is for pavements which deteriorate to the extent that they cannot be saved for maintenance and where complete reconstruction is necessary to keep them in service. The possibility is being anticipated that wartime restrictions will prevent reconstruction of some of these pavements thus forcing them out of service and requiring traffic to be taken over longer routes.

Considerable thought is being given to postwar planning. A state-wide study of program possibilities is now being completed and the department expects to proceed with surveys, plans and right-of-way acquisition to the extent that its available engineering personnel will permit. Practically the entire effort of its engineering force is required to handle access road and strategic highway improvements requested by the military and naval authorities. The size of the post-war program will depend upon the amount of money made available for that purpose.

Indiana

While Indiana's state highway department is not prepared to release figures until after the state legislature meets this month as to its operations in 1943, it does anticipate a very severe reduction in the amount of state money available due to loss of revenue amounting to from 50% to 75% of the 1942 receipts.

Uncertainty exists as to the amount of federal funds the state will receive for 1943 highway work. Such funds will be limited to only those projects that are important to the war effort. D. A. funds appropriated for the fiscal year ending June 30, 1942 amounted to $2,409,852.

While a 15% letdown in the physical condition of the highway system is expected, this is uncertain as it is not known how much traffic will decrease. It is reported that truck traffic has actually increased, and this causes more wear on the roads than ordinary passenger car traffic.

Programs for post-war work are being prepared and some surveys and plans have been made but no definite time is established for this work and the department feels that it will not be practical to do so until better indication is available as to when the war will end.

Iowa

About $14,000,000 of state highway money will be available in 1943; this represents a reduction from 1942 of five and a half million.

According to the state highway department, Iowa will receive approximately $1,250,000 of federal funds for 1943 highway work.

Of the available funds, 60% will be used in 1943 to pay highway bonds. The balance of 40% will be expended in a ratio of 9% for new construction and 31% for maintenance. This is expected to maintain the highway system on a par with the past and to keep its physical condition at the end of 1943 100% of normal.

After-the-war planning embraces projects designed to round out the completion of the initial

• A Traxcavator mounted on a Caterpillar tractor is employed by the Milne Trucking Company to dig and backfill ditches along Highway 30 near Wanatah, Ind.

• Nooseneck Hill Road between Exeter and Richmond in Rhode Island was completed in September, 1942, by the Callan Construction Co., Inc. This modern highway has bituminous macadam center lanes, plain cement concrete outside lanes, and premixed bituminous shoulders.

construction program on the state highway system.

Kansas

With the federal government reviewing all federal aid projects which are not completed at the present time, and with the probability of discontinuing such projects if it is determined that they are not essential to the war effort, it is felt impossible to estimate the amount of funds to be used for construction in 1943.

Loss of revenue as a result of gas rationing, it is believed, will fall from 35% to 50% under the receipts of 1942. Under these circumstances only the necesary access roads will in all likelihood be permitted to be constructed in the state.

Present equipment will necessarily have to do for all the state maintenance work during the coming year and it is hoped that it will be possible to hold to the same standard of maintenance as in the past, but if materials, manpower and equipment shortages become more critical, it will be necessary to resort to a lower type of maintenance.

The present maintenance condition of the highway system is slightly below what it generally is at this time of the year due to the fact that the highway department was unable to secure oil as needed to seal a large mileage of its bituminous surfaces.

Kentucky

The picture for Kentucky, as reported by the state highway department, indicates that while there will be about a 5¼ million dollar drop in 1943 available funds, the state highway system will be maintained in as good condition as it would be in normal times.

In 1942, state money available for highway work was $17,612,-932; for 1943 the estimate is $12,-350,000. Unobligated federal aid funds available if projects are approved amount to $982,638.

Of the available funds 97% will be expended for construction and maintenance with 3% expected to be diverted for non-highway use.

Future thinking is being directed toward surveys and plans for relocations, modernizing main routes, for traffic relief roads in metropolitan centers, and belt lines around Louisville and Paducah.

Louisiana

The outstanding features of Louisiana's 1942 program have been the construction of access roads to the various military establishments built in cooperation with the U. S. Army and Navy through the Public Roads Administration.

Numerous paving projects on the "strategic network" were completed, the most worthy of mention being the boulevard section between the Bonnet Carre Spillway Bridge and Kenner on the Baton Rouge—New Orleans Airline and the paving of the Lee-Micheaud highway. Three concrete paving projects and several three-application bituminous surface treatment projects were also completed on the state highway system.

Seven hundred fifty thousand dollars was spent in assisting the police juries of the various parishes in surfacing and reconditioning school bus and mail routes and farm-to-market roads. Considerbale progress was also made in the improvement of the farm-to-market system by the department's maintenance forces. One million, six hundred thousand dol-

• Equipped with a pile driving attachment, this Buckeye Clipper crane puts in guard rail posts along an Indiana highway.

• Central Construction Company improves a portion of Route 2 near East Ackton, Massachusetts. A Bucyrus-Erie 1½-yard shovel is used to skin off the old blacktop.

lars was spent in resurfacing gravel roads and rebuilding bridges.

About 108 miles of bituminous surface treated highways were reconditioned and resealed at a cost of $626,000. All of this work was in addition to the routine maintenance performed by the seven maintenance districts.

The amount of new work which can be done in 1943 will depend upon certifications by federal agencies and availability of materials, equipment and men necessary to perform the work. Because of the large volume of military and defense industry construction in this state, the supply of men and materials for highway construction has been curtailed and the department's new work is being planned to conform to these wartime conditions. For this reason approximately fourteen million dollars of funds available for general highway purposes are being deferred until such time as materials are not needed for more urgent war work.

New construction for the year 1943 is estimated at $6,100,000; the value of all work that will be carried forward to 1943, $3,100,000 and available funds for reconditioning and for farm-to-market roads is estimated at $1,000,000, making a total of $10,300,000 for highway construction, reconditioning and farm-to-market roads.

The principal features of the 1943 program will be completion of the paving of the Alexandria By-Pass, Leesville By-Pass, Baton Rouge-Amite River and Scotland-Howell Highways. In addition to these projects, several Army and Navy access roads will be constructed. Reconditioning and increasing the capacity of existing roads and bridges, including some access roads, will constitute a large part of the work to be done during the coming year.

• A concrete overpass frames this view of Pennsylvania's U. S. 19, a modern, 3-lane highway.

Maine

According to December, 1942, estimates; the state highway department will lose almost 40% of highway revenues due to the gas rationing and tire restrictions in 1943 as compared to revenues in 1942. Registration fees for 1942 amounted to $3,606,918.51; the estimate for 1943 is $2,520,000. Gas tax revenues in 1942 were $5,352,387.66 and the estimate for this in 1943 is $3,325,000.

Although no estimate of amounts available for highway work are at hand, 100% of such funds will be used for necessary construction and maintenance in 1943. Of this amount, 10% will be devoted to new construction and 90% to maintenance, depending on government action.

At the end of 1942, reports indicate that the physical condition of the state highway system as compared to normal was 95% and it is anticipated that by the end of 1943, this will decline another 10% to 85% of normal.

Although no details have been announced, the department is concerned in post-war road building plans at the present time, this consisting of advance engineering surveys.

Maryland

Comprehensive plans for post-war road building are being de-

TO **increase** OUTPUT

AND **conserve** EQUIPMENT

THE country expects our miners to produce more ore, and at the same time to make mining machinery last as long as possible—to avoid breakdowns at any cost.

This calls for blasting with Hercomite* or Gelamite*, the *modern* explosives that give maximum breakage for every dollar, explosives that lay the material down so that shovels or mucking machines can load speedily and without strain.

These explosives come in strengths and grades for almost all kinds of blasting. Many everyday users are obtaining satisfactory results with Hercomites and Gelamites for both surface and underground work.

The mining industry recognizes the extra efficiency and economy of these high-cartridge-count explosives, purchasing more of them than of any others.

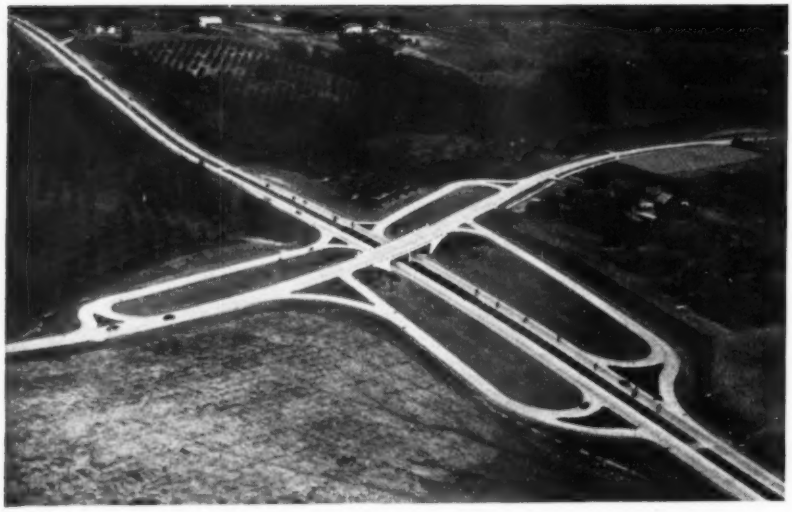
In your own interest; in the interest of increased output; and to conserve equipment that is hard to replace; we urge you to consult us about Hercomite and Gelamite for your work.

HERCULES POWDER COMPANY
INCORPORATED

*REG. U. S. PAT. OFF.

972 King Street · · Wilmington, Delaware

A-93



• Traffic on this 2-lane and 4-lane highway crossing in Missouri is safely handled by a modern cloverleaf.

veloped by Maryland's state highway department. These are taking the form of design, plan and acquisition of rights of way for future necessary enlargement of the system, both primary and secondary, and design and plans for construction of an express motor way between Baltimore and Washington, including bridges over Patapsco River at Baltimore.

Reports, based on estimates only, indicate that the receipts of state money available for highway work in 1943 will amount to $11,727,000. This compares with $18,025,081 in 1942. These figures represent both road income only and share of Baltimore City.

An estimated $1,367,490 of federal funds for 1943 highway work are expected. This total is exclusive of funds for military access projects due on allotments made in 1942.

All available funds will be used for necessary construction and maintenance without any deductions for diversion for non-highway use or for future reserve. It is estimated that the highway system had a 10% letdown from normal 1942, and that a further drop of 5% may be expected by the end of 1943, all of the 15% being attributed to shortage of labor.

Massachusetts

State money available for highway work in 1942 approximated $30,000,000. For 1943 reports indicate that this will be reduced 20% to about $24,000,000.

While $1,814,629 is estimated to be received in the form of federal funds for 1943 highway work, the department is not sure that it will be able to spend that amount. Whatever funds can be used will be expended 40% on new construction and 60% on maintenance.

The department feels confident in being able to maintain the physical condition of the state highway system 100%.

After-the-war planning consists of making studies and surveys on main routes, mostly on the strategic system for major projects. Some of the work is on Route 20 between Worcester and Springfield, and another section being studied is the circumferential highway around metropolitan Boston. Some of these studies are being made with funds made available by the Public Roads Administration, which pays 50% of the cost of such preliminary studies.

Michigan

Reports indicate that gas rationing and tire restrictions will reduce the amount of state money available for highway work in 1943 to about 50% of 1942 funds. Michigan spent $35,000,000 for highway work in 1941, $32,000,000 in 1942, and expects to spend about $16,000,000 in 1943.

All of the current funds, as well as $5,000,000 estimated from various federal sources will be used for necessary construction and maintenance now and no monies will be diverted for non-highway use or set aside for future highway work. Available funds will be equally divided between new construction and maintenance work.

Michigan has already assigned several men to the task of formu-

• Gravel for the maintenance of America's roads is the product of portable crushing plants of this type. Here, an Iowa Manufacturing Company tandem plant is busy on a war project.

lating post-war road building plans and will be ready to launch a construction program as soon as the time is opportune.

Minnesota

To the extent that engineering personnel is available, the Minnesota state highway organization expects to continue with field surveys and preparation of plans for future work. By the end of 1943, completed plans available for new contracts, should represent approximately the two-year normal program.

In 1942, $15,500,000 was available in state money for highway work. It is estimated that in 1943, this amount will drop to $9,500,000 but will be supplemented with about $1,000,000 of federal funds. Eighty-five per cent of such available funds will be used for necessary construction and maintenance in 1943, with 15% being withheld for future requirements. Of the 85% to be expended in 1943, 35% will go into new construction projects and 65% into maintenance.

With this program, reports reflect the highway department's confidence in being able to maintain the highway system at 100% efficiency.

Mississippi

Conditions affecting the operation of the state highway department are so uncertain that no prediction as to activities or funds to be made available can be announced at this time.

Reduction of gasoline tax revenues plus the lack of materials due to government regulations and high prices of bids by contractors and their reluctance to anticipate state conditions foreshadow a discontinuance of new construction during the present crisis.

Until a definite, upward trend of the revenue is in sight, Mississippi's highway department feels compelled to function in maintenance capacities only.

Missouri

Despite anticipated availability of a sizable fund for highway use in 1943, an active program of postwar planning is being undertaken. This will take the form of laying out important sections of strategic networks and advanced engineering projects in metropolitan areas set up under authority of the 1941 Highway Defense Act.

Preliminary estimates indicate a reduction of about ⅓ in the amount of state revenue available in 1943. In 1942 this figure was $24,366,300. For 1943, the estimate is $16,244,200. However, it is anticipated that a considerable carry-over of uncommitted funds from 1942 will be available in 1943 which brings the total of state highway funds to about $23,244,000. This will be allocated as follows:

Used for necessary construction and maintenance in 1943	23.7%
Diverted for non-highway use	none
Held for future highway work	17.2%
Bond Service, Costs of Collection, Administration, etc., $13,754,800	59.1%
	100.0%

New construction will take 10%; maintenance, 90%. Federal

GENERAL SUPERCRANES CONSERVE VITAL FUEL, MAN-POWER AND MACHINERY

GENERAL recommends the continued purchase of War Bonds and Stamps—and the observance of preventative maintenance to keep your machinery running.

Powered by one motor and controlled by one man the SUPERCRANE moves about freely on its pneumatic tires. Movement is much faster, with reduced wear on moving parts.

Available as Crane, Clamshell, Dragline, Magnet and Pile Driver.

The OSGOOD COMPANY
Sizes: ½ to 2½ Cu. Yd.
Diesel-Oil-Gas-Electric
Associated with The GENERAL EXCAVATOR CO.

The HERCULES COMPANY
HERCULES "IRONEROLLERS"
6 to 12 Tons
Diesel or Gasoline
Associated with The GENERAL EXCAVATOR CO.

GENERAL
Sizes: ⅜-½-⅝-¾ Cu. Yd.
Diesel—Gas—Electric
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE GENERAL EXCAVATOR COMPANY, Marion, Ohio

• An Austin - Western tandem roller owned by Nevada's state highway department operates on U. S. 93, 10 miles south of Ely.

funds to the extent of $1,250,000 will be requested. The physical condition of the highway system as compared to normal at the end of 1942 was estimated to be 90%. Because of the necessarily curtailed program for 1943, the condition is expected to be about 80% of normal at the end of 1943. This 20% letdown is attributed to 5% caused by shortage of equipment and 15% shortage of labor.

Montana

Whatever funds may be available for highway work in 1943, will be devoted 100% to maintenance.

Montana's state highway department reports an anticipated loss of revenue due to gas rationing and other restrictions of 50% as compared with 1942. Last year, this amount was $5,000,000 and the department expects the revenue to drop in 1943 to $2,500,000. Uncertainty is felt as to receipt of federal funds for 1943 work, this depending on the attitude of the War Department.

It is believed possible to keep the physical condition of the highway system within 80% of normal by the end of 1943. Plans for post-war building are being made upon the assumption that a normal federal aid program will be carried forward after the war.

Nebraska

As in most states, gasoline tax is the principal source of income for Nebraska's highway construction and maintenance work. Reports indicate that estimated receipts from this source were about $5,750,000 in 1942, and that this sum will drop down to about $4,000,000 in 1943. About $1,000,000 are expected from federal funds to augment this sum.

Nebraska expects to use about 45% of available funds for necessary construction and maintenance work, while the balance of 55% will be held for future highway work. At present, no diversion of highway funds is expected. About 40% of the state's '43 expenditures for highway work will be for new construction, while 60% will be devoted to maintenance.

Unless unforeseen conditions such as shortages of materials, equipment or labor prevent Nebraska from doing so, this state plans to maintain its highway system as well as it has been maintained in the past. Plans are now afoot for post-war highway construction work and current preliminary work is being accomplished on projects felt to be the most essential.

Nevada

Although a considerable drop in highway revenue is anticipated in 1943, reports indicate that whatever funds are available will be used in the proportion of 40% on new construction work and 60% on maintenance.

The amount of state money to be available in 1943 is estimated at $1,395,000. This represents a substantial decrease from $2,325,000 available from these sources in 1942. Unless emergency funds are allocated by the president, no federal funds for 1943 highway work are expected.

The department is busy with post-war road planning. This is taking the form of surveys and preparing plans for a considerable mileage of reconstruction on the inter-regional highway system as well as for by-passing of congested urban areas.

Due to shortage of funds, a decrease of 20% in the condition of the state highway system as compared to normal is anticipated by the end of 1943.

New Hampshire

The estimate of the amount of state money available for highway work in 1943 is $2,750,000. This

• Culvert in place, this Bucyrus-Erie Bullgrader mounted on an International tractor tackles the job of placing a 20-foot fill on this Allegany County, New York road.

LITTLE THINGS
That lead to big dragline output

In addition to such major factors in dragline output as job layout, operator's skill, careful lubrication, proper clutch and brake adjustment, etc., a host of details can swell the production record. Here are just a few:

1. Keep boom at highest angle possible for particular job.
2. Do not use bucket of larger capacity than recommended for normal rapid operation.
3. Keep bucket teeth sharp and built up to proper size. This will protect lip from unnecessary wear, as well as increase digging speed.
4. Inspect drag chains regularly, paying particular attention to end links which are subject to greatest wear. Chain life can often be increased by reversal or by cutting chain in middle and using repair links to reverse sections.
5. Do not pull drag chain into fairlead.
6. Hoist bucket from digging as soon as it is filled.
7. Watch fairlead. Keep sheaves lubricated and well bushed. Clean out regularly dirt brought in by rope.
8. Short lengths of cable salvaged from hoist or drag ropes can be used for dump cable. Be sure length is same as original dump cable to insure best dumping characteristics.

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS AND STAMPS

BUCYRUS ERIE

Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. ★ ★

Bucyrus-Erie

SOUTH MILWAUKEE • WISCONSIN • U. S. A.

• Field repair and maintenance of equipment is of paramount importance these days. Illustrated is a P&H welder in action on a scraper repair job.

represents almost a 50 per cent drop from the 1942 income of $4,600,000. No federal funds to be used for highway work are anticipated this year.

Of the funds available, 95 per cent will be expended on maintenance work and 5 per cent on new construction.

During 1942 it is estimated that there was a 10 per cent letdown from normal of the physical condition of the highway system and that by the end of 1943, there will be a further 10 per cent drop all of which is attributable to shortage of funds.

Advance engineering studies are now being made by the highway department for development in the postwar program.

New Jersey

New Jersey highway fund revenues, under the depressing effect of wartime rationing of gasoline, tires and motor vehicles will drop $20,792,225 in 1943 below the level of 1941, it was predicted by State Highway Commissioner, Spencer Miller, Jr., in his annual report to Governor Charles Edison made public last October in Trenton.

Next year's yield from motor fuel taxes and motor vehicle registration fees, which represent the state's two principal sources of highway fund revenue, is expected to total about $19,000,000 less than in 1941, when collections reached their peak and the highway department had its last year of "normal" operation.

Anticipated fuel tax collections for 1943 are put at approximately $16,000,000 compared with actual collections of $29,032,536 in 1941 and an estimated total of about $20,500,000 this year. License fees are expected to produce $16,200,000 as compared with $22,053,924 in 1941 and $21,300,000 this year.

To some extent offsetting the anticipated sharp revenue drops next year was Commissioner Miller's report that revenues for the 1942 calendar year probably would exceed by $3,325,000 the state legislature's estimate, which had purposely been kept low because of wartime uncertainties.

Counting all sources of revenue expected to be available, Commissioner Miller said next year's highway fund would total $36,887,000 as against $46,766,000 this year. The highway department, however, is only one of several state agencies depending on the highway fund for revenue. Of this year's total of $46,766,000, only $32,000,000 was received by the highway department, the balance being appropriated for other agencies, to meet unemployment relief expenditures, and to wipe out a deficit.

Of the total that does go to the highway department each year, only a small percentage is generally allocated for state highway construction. This department's projected 1943 state construction and right-of-way acquisition program totals $7,148,750, a reduction of only $142,688 under the current-year appropriation. Actually, however, there is little likelihood that all of the projected amount will go into construction next year. As in the past, diversions to unrelated uses by the legislature are expected to cut

• Clifton by-pass on New Jersey's 4-lane Route 6 is a good example of modern highway planning

deeply into the proposed construction total.

Besides the $7,148,750 proposed for construction, other projected allocations from next year's available revenues would include: debt service, $5,290,098 as compared with more than $7,000,000 this year and more than $10,000,000 in 1941; aid to counties, $6,735,000 and to municipalities, $3,150,000, same as this year; operation of motor vehicle department, $1,707,880; state police, $812,159; highway maintenance, $3,800,000; highway administration, $1,616,642; funding of bonds authorized but not issued, $621,050; highway lighting and traffic signals, $460,000; expenses of the motor fuel tax division of the state tax department, $255,000.

Major items in the proposed construction program include $2,000,000 for a connecting link between Route 25 near the beginning of the Pulaski Skyway in Newark and the entrance of the Lincoln Tunnel; $1,160,000 for widening five miles of Route 6 from Denville to Spicertown, and $500,000 for purchase of a site to build a new bridge across the Passaic River between Newark and Harrison.

New Mexico

Just what effect present conditions, particularly gas rationing, will have on the operations of New Mexico's state highway department is an unknown factor. Because of the uncertainty, it is impossible to formulate any plans for the highway department operations this year at this time. However the following carefully estimated analysis of 1943 income has been prepared.

Early in 1942 it was estimated that tires were available so that the average vehicle could travel in New Mexico the equivalent of 2.7 years of normal driving. As only about 0.7 of a normal year's driving was done in 1942, and as some new tires and retreads have been made available, it is estimated that 12% of the vehicles in service on January 1, 1942, will be out of service at the end of the year.

It is doubtful if gasoline rationing alone will cause a reduction in total number of cars registered, as the tires from those stored will be available for use on vehicles which would otherwise have to be stored. As vehicles will have to be registered to obtain gasoline, there may be a higher percentage registered for the full year, instead of fractions of the year. There were 97,127 passenger cars, 30,806 trucks, and 5089 other vehicles registered in 1941, but normally, approximately 11% of the vehicles go out of service each year, so it is estimated that in 1943 there will be registered 75,759 passenger cars, 24,125 trucks and 4800 other vehicles.

Passenger car fees decrease each year until the vehicles are five years old, and truck fees decrease at the end of the second year. Taking this factor into account, the total fees estimated to be collected will be $1,241,181 in 1943, of which the highway department should receive $487,000. However, a conservative estimate would be $400,000.

Mileage taxes assessed against

IF YOU will chart the service record of Preformed "HERCULES" *(Red-Strand)* Wire Rope—as so many have done—you, too, will have definite proof of the savings that its use provides.

You will find a saving in steel because of its longer life; by the same token you also save time, as replacements are less frequent. And the sum of the two savings is greater economy.

The consistent top-flight performance of Preformed "HERCULES" *(Red-Strand)* Wire Rope is not a matter of chance. Like all wire rope bearing this well-known name, it is made of acid open-hearth steel wire . . . selected by rigid tests to make sure that it meets our exacting requirements. It is then carefully manufactured according to sound fundamental principles.

The more hours of work you can get out of every pound of wire rope you use, the more steel you save for other vital war purposes. Regardless of the kind or make of wire rope you now have, it will not be able to give you the full service of which it is actually capable unless it is handled correctly and operated under proper working conditions. For further information on the proper use, care and application of wire rope, feel free to consult our Engineering Department.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

trucks and buses operating for hire average annually about $210,000 to the highway department. In 1943 it is estimated that this amount will drop to $150,000.

Of the passenger cars, approximately 25% will be able to obtain more than four gallons per week, but they still will not use as much as normally, owing to reduced speeds as well as limitations on use. It is estimated that such vehicles will obtain an average of 10 gallons per week, or 500 per year. Not all of the remaining 75% of the passenger cars will use four gallons per week, as approximately 15% of the total do not normally use that much, so it is estimated that each of these will only use an average of 190 gallons per year. Of the estimated 75,759 passenger cars in operation at the first of the year, it is estimated that only 70,607 will be in operation at the end of the year. On the basis of the average number of vehicles and estimated gasoline consumption per vehicle, the total income from passenger cars will be $950,000.

Truck traffic increased in 1942. Many of these will continue to operate at a normal amount in 1943, as approximately 50% will be able to obtain sufficient gasoline. The amount of driving by the remaining 50% will be reduced by at least one-half. On this basis, the total income from gasoline taxes on trucks, buses and combinations, will be approximately $870,000 in 1943.

The total estimated income from gasoline taxes in 1943 is $1,990,000 which is a decrease of 60.3% from 1941. Gasoline rationing in the East has caused a decrease in traffic of approximately 40%, but they do not normally have the high percentage of foreign traffic that New Mexico has. The above estimate anticipates a decrease of 45% in revenue from New Mexico vehicles and a 90% decrease from foreign vehicles.

In 1942 the actual and estimated gasoline tax collections net for highway purposes (road fund plus debentures) amounted to $3,765,000. On the basis of the above analysis, it is estimated that in 1943 this will amount to $1,990,000.

On the basis of the above estimates, the total anticipated revenue to the highway department for the current year 1943 will be:

Motor Vehicle Registration Fees	$ 400,000.00
Motor Bus—Mileage Taxes	150,000.00
Gasoline Tax	1,990,000.00
Total	$2,540,000.00

The state is obligated at the present time to the amount of $1,985,000 for debt service on debentures. After deducting this amount from the total above, there will be a balance of $555,000 available for the operation of the department, which, at the present time, is at the rate of $1,800,000 annually. This would result in a deficit of $1,245,000. In view of this situation it is expected that the legislature will be asked to authorize a change in the financing of the debentures to eliminate payments for principal retirements and to provide only for the payment of the interest on the debentures outstanding.

New York

While no figures were available at press time, reliable reports indicate that the amount of state money available for highway work in 1943 will be about the same as for 1942.

However due to shortage of bitumen and restrictions of the federal government on letting construction contracts, New York's highway system is not expected to be maintained at the same level as in the past.

Receipt of federal funds for 1943 highway work is deemed doubtful, this requiring an act of Congress. A large balance already remains in New York as in most other states.

Plans for expenditure of $30,000,000 for highways and $30,000,000 for parkways to be raised by bond issues are being formulated for post-war development. In addition there is a balance of approximately $13,000,000 of state and federal aid funds unobligated.

North Carolina

Information received from state highway department indicates

In War-Time . . . .

use *time-saving* equipment

Moving materials quickly . . . without wasting man-power and with the least wear and tear on your trucks . . . is one way you can cooperate in the war effort. Brooks system offers you this advantage. Mount a LOAD LUGGER on the chassis . . . no alteration of frame necessary . . . and make use of 5 to 10 one-piece leak-proof buckets for loading, hauling and dumping continuously. It is easier and faster . . . eliminates idle trucks waiting to be loaded . . . conserves equipment and cuts down repairs and replacements. For full details, ask for catalog 44.

Brooks LOAD LUGGER Trade Mark Reg

Simple, sturdy construction
Low headroom
Double action hoisting unit

Only 15 seconds for picking up bucket, dumping or setting back on the ground

Brooks EQUIPMENT AND MFG. CO.

301 Davenport Road Knoxville, Tennessee

Distributors in all Principal Cities

that there will be a $12,000,000 reduction in the amount of state money available for highway work in 1943 due to loss of revenue because of restrictions on automobile operation. This amount in 1942 was $32,000,000, and is expected to shrink in 1943 to $20,000,000.

One hundred per cent of available funds will be used for necessary construction and maintenance, none to be diverted for non-highway use. Of this amount 90% will be allocated for maintenance work, the balance of 10% going into new construction.

Considering the physical condition of the highway system at the end of 1942 as 100% normal, it is anticipated that by the end of 1943 there will be a drop of 15%.

While federal funds for 1943 highway work are anticipated, the estimated amount is undetermined at the present time.

The department is actively engaged in making surveys for postwar activities and plans are being prepared as personnel will permit for future work.

North Dakota

Like other states of relatively small population which have depended in the past to a large extent on income for highway work from gas tax and similar revenues, North Dakota anticipates a severe drop in revenues for 1943 operations.

While the amount of state money available for 1942 highway work was $3,220,000, reports from the state highway department suggest that this will drop in 1943 to $1,870,000, or a loss of $1,350,000. Under these circumstances it is anticipated that, as compared with the physical condition of the state highway system at the end of 1942, there will be a loss of 25% in the condition of the system at the end of 1943. This letdown is being attributed in this proportion: shortage of funds, 10%; shortage of equipment, 5%; shortage of labor, 10%.

While the state expects to receive federal funds for 1943 highway work, no estimate of the amount is at present available. Twenty per cent of the amount of money to be expended on highway work will be devoted to new construction and 80% to maintenance; no funds will be devoted to non-highway use or set aside for future work. Because many of the highway department engineers have entered the U. S. armed forces or have left for other war work, the department is operating on a curtailed basis.

Ohio

The effect of decreased motor car operation in 1943 is expected to be severely felt in the amount of state money available for highway work in 1943. In 1942, $21,300,000 was allocated for new construction. In 1943, it is anticipated that this figure will drop to $11,300,000. For maintenance in 1942, $19,000,000 was used and for 1943 it is expected to drop to $14,000,000. While receipt of federal funds for highway work are anticipated in 1943, the estimated amount is not known. The division of available funds for highway work must await the appropriation by the legislature, but it was not planned in any event to divert funds for non-highway use nor to reserve any of it for future operations.

Looking ahead to postwar activities, the department has already submitted a federal advanced engineering program for 162 miles of metropolitan extensions of the state highway system. A purely state planning program is being prepared for rural and small urban projects.

Making allowance for reduced traffic, a 25% letdown in the maintenance of the highway system in 1943 is anticipated. Causes are attributed in the following proportions: shortage of funds, 15%; shortage of equipment, 3%; shortage of labor, 7%.

Oklahoma

A report from the state highway department indicates that there will be a reduction of $1,500,000 in the amount of state money available for highway work in 1943, due to gas rationing and tire restrictions. In 1942, $9,000,-

FOR BIGGER PAY-LOAD DIGGING
HAISS
HI-POWER
LOWER SHEAVES
HIGH ABOVE
COUNTERWEIGHT!
Up out of the muck. Non-pocketed. No place for dirt to jam, to cause friction or rope wear . . . in one test, 40% better efficiency than next best bucket.
Buckets in stock at New York, Philadelphia, Baltimore, Atlanta, Richmond, Charlotte and Los Angeles . . . Write or wire for prices, delivery and catalog details.
GEORGE HAISS MFG. CO., INC., 144th ST. & PARK AVE., NEW YORK

• A cloud-studded sky lends beauty to this view of a section of Texas' U. S. 90. This important military highway connects San Antonio with the Mexican Border.

000 was available; for 1943, the estimated figure is $7,500,000.

Of this amount, 100% will be used for necessary construction and maintenance, 33% for new and 67% for maintenance. While federal funds are anticipated, no estimate of the amount can be made, this being dependent upon projects to be approved.

Making allowance for reduced traffic, a letdown of about 15% in the maintenance standard of the highway system is anticipated, this reduction being due broadly to three factors: shortage of funds, shortage of equipment and shortage of labor. The physical condition of the system at the end of 1942 was 95% of normal; on the basis of anticipated traffic and the maintenance program, the highway system at the end of 1943 is expected to be 80% of normal.

Post-war road-building plans are being formulated. A program has been prepared for Federal Works Reserve amounting to about $90,000,000 for a 6-year period. Plans are now ready on $8,000,000 worth of projects.

Oregon

Gas rationing will cause an expected drop in state money available for highway work in 1943 of $6,300,000 as compared with income in 1942, a report from the state highway department indicates.

Highway activities in the coming year will be on a proportion of 60% for maintenance and 40% for new construction—the latter mostly carry-over work started in 1942. Twenty-five per cent of available funds will be set aside for future highway work, according to R. H. Baldock, state highway engineer.

Oregon expects to receive $3,500,000 in federal funds for 1943: $500,000 on work to be contracted in 1943 and $3,000,000 on work remaining to be done under existing contracts.

The physical condition of the highway system is expected to hold up quite well. With an estimated condition at the end of 1942 of 95% of normal, it is anticipated that by the end of 1943 it will be 90% of normal; while part of this drop will be due to equipment shortage, 75% will be caused by lack of labor.

The department is actively engaged in making surveys for major reconstruction and improvement projects on inter-regional highway routes.

Pennsylvania

(No information available.)

Rhode Island

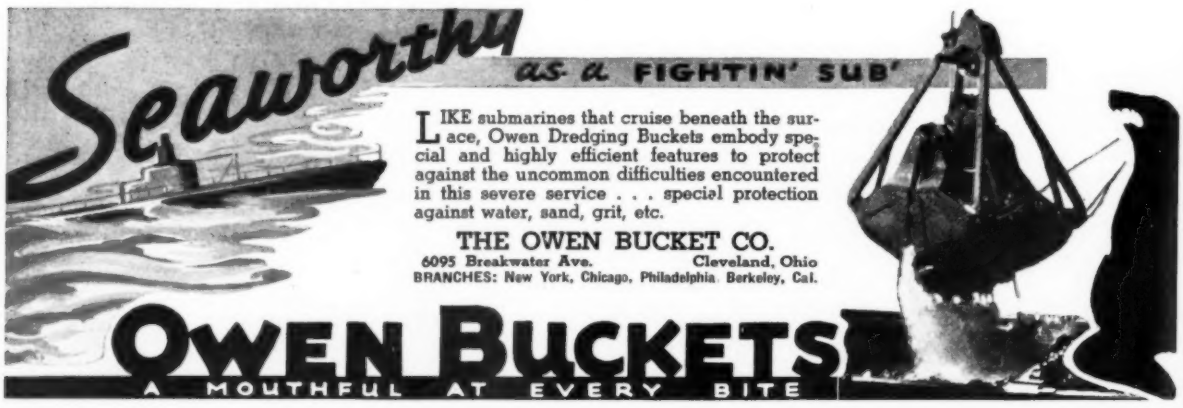
All available funds for 1943 highway work will be used in maintenance operations.

The present estimate of the effect of gas rationing on highway income is that the total will drop from $6,500,000 in 1942 to $5,500,000 in 1943. In this connection it is pointed out that all revenue from gas tax and motor vehicle registration fees is credited to the state's general fund and appropriations for the construction, improvement and maintenance of state roads and bridges are made therefrom by the legislature.

Under these circumstances, 43% of the above mentioned $5,500,000 will be used for construction and maintenance work while 57% will be allocated for non-highway use.

The physical condition of the roads is expected to drop from its present rating of 95% of normal to 85% by the end of 1943, attributed 50% to shortage of materials and 25% each to shortage of funds and labor. No federal funds are anticipated.

Post-war road building plans to be developed during the present year include surveys and plans for the reconstruction of main routes, involving relocation, grade separations, etc. Studies are also being made of methods to improve traffic flow between and through principal cities of Rhode Isand.


Seaworthy
as a FIGHTIN' SUB
LIKE submarines that cruise beneath the surface, Owen Dredging Buckets embody special and highly efficient features to protect against the uncommon difficulties encountered in this severe service . . . special protection against water, sand, grit, etc.
THE OWEN BUCKET CO.
6095 Breakwater Ave. Cleveland, Ohio
BRANCHES: New York, Chicago, Philadelphia Berkeley, Cal.
OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

South Carolina

As of October 30, 1942, the state highway system comprised 11,935 miles. This consists of the following types:

Standard Pavement	2,682 miles
Bituminous Surfacing	4,505 miles
Earth Types	4,493 miles
Under Construction	255 miles
Total	11,935 miles

Specific information as to the program for 1943 was not available at press time. All new construction, except those projects such as access roads, etc., vital to the war, is being deferred. Maintenance operations have been reduced to the very limit, and the personnel of the department has been reduced in proportion.

South Dakota

While indications are that South Dakota will suffer a $1,860,000 loss in state money available for highway work, due to restrictions on automobile traffic, a considerable balance remaining from 1942 can be utilized to make up the anticipated shortage. In 1942, $4,460,000 for state funds were allocated for highway use. For 1943 this is expected to drop to $2,600,000. However, to this can be added $2,000,000 remaining from 1942.

In addition, federal funds to the extent of $6,340,000 are expected.

Only 35% of available funds, reports indicate, will be used for construction and maintenance this year, 65% to be reserved for future highway work. About 70% of the funds to be expended will be used on maintenance and 30% will be devoted to new construction.

With this program it is felt reasonably sure that the department will be able to keep the physical condition of the system during 1943 at its present level.

As to the future, surveys have been made and plans will be prepared for the construction and reconstruction of approximately 500 miles of highways on the federal primary and secondary systems.

Tennessee

No estimates are available as to the amount of state money available for highway work in 1943 or the affect of gas rationing and other restrictions on the highway income.

The federal fund figure has also been withheld, dependent on projects approved as necessary to the war effort.

Tennessee plans to use 30% of its available '43 funds for necessary construction and maintenance work, while 70% of its funds will be diverted for non-highway use. Of the amount set aside for highway work, 30% will be devoted to new construction and 70% will be assigned to maintenance.

About a 30% "let down" in the maintenance of its highway system is expected by Tennessee because of shortage of funds as well as labor. The state is preparing a backlog of needed improvement projects for post-war activity.

Texas

With an estimated fund of $22,000,000 of state money available

GATKE BRAKE BLOCKS
Save Tires and Time

GATKE BRAKE BLOCKS are *CUSTOM-BILT* for each make, year and model of Truck, Tractor and Trailer.

Correct braking power with *even, non-grabbing action* that avoids *rubber-destroying* skids—

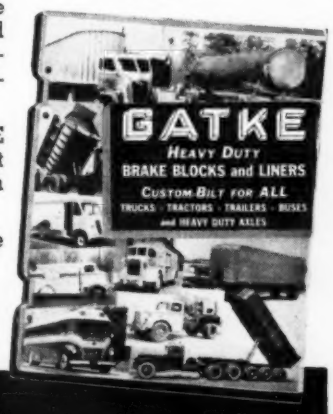
Safe, *dependable* stopping under *all service conditions*—

Extra miles of *wear life* that keeps them rolling with *fewer* adjustments and *less time out* for maintenance—

These are a few of many advantages that make GATKE *CUSTOM-BILT* Brake Blocks and Liners *important* time and money savers on *road building, excavating,* and *construction* jobs of *all* kinds—*everywhere.*

Make this simple test. Use GATKE *CUSTOM-BILT* Brake Blocks on your next five relines and compare results with the *best you have ever had.*

Just ask your GATKE Jobber or write for particulars.



GATKE CORPORATION
BRAKE BLOCK DIVISION
232 N. LaSalle St. Chicago

Write for free copy of New Heavy Duty Catalog

for 1943 highway work, the state highway department attributes this substantial reduction from 1942's $34,947,000 fund to the effects of gas rationing and similar war restrictions affecting the operation of automobiles.

Federal funds to be allocated for 1943 road work are estimated at $5,742,250.

Ninety per cent of available funds will be used for necessary construction and maintenance while 10% will be set aside for future highway use. New construction work and maintenance will be given equal attention.

As to post-war planning, the state highway department reports as follows: "We have $36,000,000 in approved jobs of all construction types, well distributed over the state, consisting of a balanced selection from all types of highways, rural and urban, and varying as to size so as to attract contractors of any rated capacity. Over $10,000,000 of projects from this group are in the completed plans stage with the balance under way."

A drop of about 40% in highway system maintenance is anticipated, due half to labor shortage and half to federal regulations. Despite this the physical condition of the system at the end of 1943 is expected to be 95% of normal —a drop of only 3% from the 98% of normal existing at the end of 1942.

Utah

Gas rationing and tire restrictions are expected to reduce the amount of state funds available for highway work this year in Utah from $4,200,000 in 1942 to $2,520,000 this year according to reports from the state highway department.

This figure is believed to be the absolute minimum below which funds from gasoline tax cannot fall without going below the volume of essential transportation service. It will probably be necessary for the legislature to provide additional highway funds.

While $1,500,000 are expected in the form of federal funds for highway work, this sum has already been apportioned.

Whatever amount becomes available, 100 per cent of it will be used for necessary construction and maintenance, none being diverted for non-highway use or held for future operations. Seventy per cent will be spent on new construction and 30 per cent on maintenance.

The physical condition of the highway system as compared to normal was estimated to be 90 per cent at the end of 1942. By the end of 1943, it is expected to drop another 20 per cent. This condition is attributed 50 per cent to shortage of equipment, 25 per cent to shortage of funds and 25 per cent to shortage of labor.

Due to the urgency of present activities plus an acute shortage of personnel, all attention in the highway department is now being devoted to current needs. All engineering forces are occupied in essential construction work required in connection with the war effort. It is anticipated that this year a start will be made on the postwar program.

• Summer foliage gracefully frames this view of Vermont's Route 15 between Johnson and Jeffersonville which was constructed with a mixed-in-place surface.

Vermont

Vermont's department of highways anticipates a reduction in revenue to the state for highway work in 1943 of approximately 55% of the 1942 revenue. This will make the 1943 picture one principally of maintenance, due not only to the shortage of funds but also to a shortage of manpower. It is hoped, however, that highways will be maintained in creditable shape through curtailment of construction work.

An appropriation distribution plan reducing the amount to be spent for highway purposes during the 1942-1943 fiscal year was announced last summer by Governor Wills. This provides a cut from an authorized total of $4,177,675 to $2,245,000, or a cut of $1,932,675.

The reduction in the highway allocations was necessitated by an estimated decrease in revenues during 1942 to $3,000,000 from a total of $5,568,000 in 1941. The new reduced expenditure program makes every effort to avoid cutting down funds for maintenance. The plan left a $127,000 reserve for contingencies. Fixed charges of $1,400,743 for principal and interest of flood bonds and storm notes of $223,200 for operation of the motor vehicle department will be met without reduction.

Virginia

State funds amounting to $23,844,000 are expected to be available for highway work in 1943. This represents a reduction of $7,775,000 from the $31,619,000 in 1942.

In addition to this sum, federal

• This scenic view of the State of Washington's Primary Highway 15 through Stevens Pass makes one yearn for the good old days when unlimited quantities of tires and gasoline were available to all.

funds in the amount of $2,541,158 are anticipated. Virginia's state highway department expects to use 60% of available funds for necessary construction and maintenance work, setting aside for future purposes 40%. Of the amount to be spent for 1943 highway work, 25% will be devoted to new construction and 75% to maintenance.

While the estimate of the physical condition of the state highway system at the end of 1942 is 90% of normal, it is felt by the end of 1943 this will drop another 10% to 80%. Reasons attributed for this condition are 5% due to shortage of equipment and 15% due to shortages of labor and material.

During the calendar year 1942, the highway department advertised and awarded 50 road and bridge contracts, amounting to approximately $10,359,800. In addition, convict labor construction projects, involving approximately $3,350,000 were authorized, and 25 free-labor projects amounting to approximately $750,000. Also, during this period, there were 20 contracts for bituminous materials let, amounting to approximately $3,645,885, making a grand total of contracts awarded in 1942 of $18,105,720.00.

Summary By Types Let to Contract

Graded and Drained	9.70 Miles
Gravel, Surf. Treated	2.79 Miles
Macadam, Surf. Treated	27.80 Miles
Concrete	58.61 Miles
Concrete, Bit. Top	5.46 Miles
Curb and Gutter	1.06 Miles
	105.42 Miles

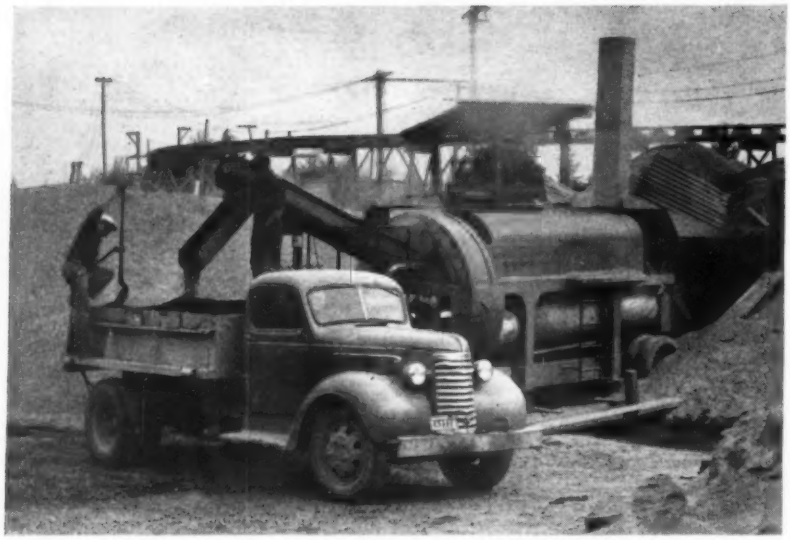
Summary By Types of Convict and Free Labor Projects

Soil, Surf. Treated	4.97 Miles
Surface Treatment	4.21 Miles
Crushed Stone	3.24 Miles
Bit. Plant Mixed Materials	11.49 Miles
Conc. Widening, Bit. Top	0.69 Miles
Macadam, Surf. Treated	70.77 Miles
	95.37 Miles

Active planning for the future includes allocation of funds to certain projects, designing road and bridge plans and post-war plans financed by federal funds in anticipation of large post-war public works grants.

Washington

Present indications are that gas rationing and tire restrictions will



• Owned by W. H. Pielow, Seattle, Washington, this Universal twin dryer asphalt plant is kept busy turning out material for various war projects.

reduce the amount of state money available for highway work in 1943 from $9,150,000 in 1942 to $8,500,000.

Federal funds are not anticipated, except for access road and flight strip work, the amount of which is unknown at present.

About 80% of available funds will be used for construction and maintenance work this year with 20% being set aside for the future. Highway activity will be divided about equally between new construction and maintenance work.

Taking the physical condition of the roads at the end of 1942 as 100%, it is believed that there will be a drop of 10% in the condition of the highway system by the end of 1943, causes for that condition being divided equally between shortages of equipment and of labor.

The Washington state highway department faces the same problem of shortage of man-power as other state organizations, but as rapidly as its limited personnel will permit, it is preparing location and plans for post-war projects.

West Virginia

As is reflected in the reports submitted by all state highway departments, gas rationing will severely curtail West Virginia highway construction activities in 1943. Motor fees and gas tax are expected to yield about $9,400,000 in 1943 as against $14,600,000 in 1942.

No new construction work is planned; the entire amount available will be expended in maintenance, we are informed by Ernest L. Bailey, state road commissioner.

It is expected that sufficient additional funds will be provided by the legislature to maintain the road system at approximately its present standard.

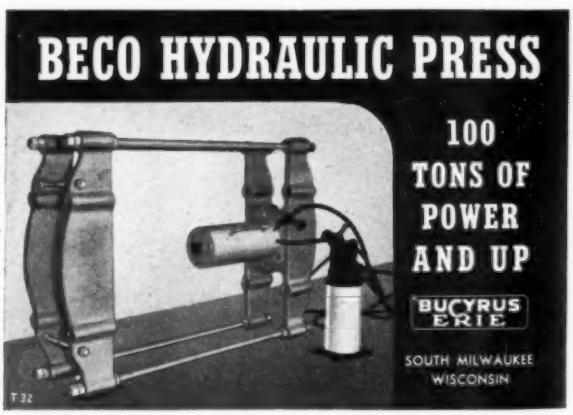
A long-range program is being envisioned for future development. Grade crossings have been rated for elimination. Plans and surveys have been completed for many projects while rights of way are being acquired for post-war construction.

Wisconsin

The following statement regarding the 1943 highway picture in Wisconsin has been furnished by the state highway department.

Income from vehicle motor register and fuel tax fees for the fiscal year July 1, 1941 to June 30, 1942 was $36,000,000. The current estimate for the fiscal year (1942-1943) is $25,000,000. Under the method of allocation in this state, this reduction will be reflected in the amount of money which will become available for the state trunk highway system inasmuch as funds available are the residue after meeting statutory allocations of road aids to towns, cities, villages and counties.

It is anticipated that available highway funds in 1943 will be expended solely for maintenance work, no new construction now being planned. Under existing con-



• This picturesque, well-maintained Wyoming mountain highway has an oiled surface for longer wear.

ditions it is anticipated that our system can be maintained as well as in the past. We believe that any reduction in maintenance will be due essentially to shortages of material rather than of funds, equipment or labor.

It is anticipated that federal funds, heretofore apportioned to the state, will not be available for highway work in 1943.

Plans for highway improvements for the post-war period are now being made to the extent that funds are now set up for work which has been deferred due to the war emergency and as current funds become available and are allotted to projects under existing statutes, even though proceeding with the work is to be deferred for the period of the emergency.

Wyoming

Wartime economy requiring many adjustments in the operation of the highway department is presenting particularly severe problems at this time. Loss of experienced engineers and other employees together with the reduced labor force and restrictions on materials have hampered and delayed much construction work in Wyoming during 1942. Restrictions which were imposed on road oil and asphalt products directly affecting the maintenance operations have recently, however, been relaxed to the extent that there is now sufficient asphalt available to keep road surfaces well maintained, unless further drastic war restrictions are imposed.

In spite of all of these discouraging factors, the department so far has been able to keep the roads in Wyoming maintained at their usual high standard. Funds accruing to the state highway department for future maintenance purposes will be drastically decreased, gasoline rationing alone being estimated to reduce receipts by 50% in 1942 in addition to a reduction of approximately 20% from the same source in 1942.

One major new construction project may be carried out in 1943. This is a project providing access to an airport near Rock Springs, and is contingent upon several "ifs." Chief among these are whether the state will be successful in obtaining critical materials to construct an overhead crossing and timber bridge on this road and whether sufficient contractors will bid on the job and the P. R. A. approve the construction.

The highway department estimates that $70,000,000 will be required to complete the Wyoming state highway system or bring it up to a desirable post-war standard of construction. In normal times, about $5,000,000 have been available for construction each year and at this rate it will take 14 or 15 years to achieve a standard to handle future increases in traffic and transportation demands. Approximately 3,000 miles of highway construction will be involved in this proposed post-war program.

Dig, Haul, Dump

in one operation!

On jobs where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway is a great money-saver because it will dig, haul and place the materials without the help of other equipment.

First cost of a SAUERMAN machine is reasonable, maintenance expense is small, and the simplicity of operation permits easy one-man control of even the largest installation.

This equipment is very flexible and is readily adapted to meet new and difficult working conditions. Sizes range from small portable units designed for cheap handling of a small hourly tonnage of loose materials up to powerful machines that will move as much as 1,000 tons per hour of the toughest materials.

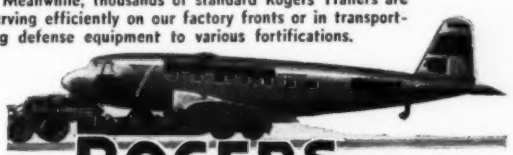
Write for our catalog and see for yourself how others have cut costs on hundreds of dig-and-haul jobs with SAUERMAN Machines.

SAUERMAN BROS., Inc.
574 S. Clinton St., Chicago

Tanks produce results only in actual combat on the firing line.

To conserve their fighting capacity they ride to battle on Rogers Trailers, or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense equipment to various fortifications.



ROGERS BROTHERS CORP.,
ALBION, PENNA.

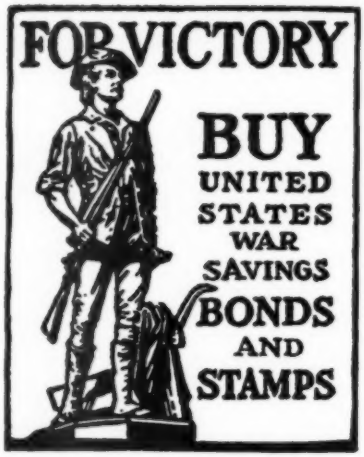
ROGERS
LOW BED-
-HEAVY DUTY
TRAILERS

Notes from the manufacturers

The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, announces its first award program in the field of undergraduate engineering study. The foundation's new project is the $6,750 annual engineering undergraduate award and scholarship program. Its object is "to encourage engineering students to study arc welded construction so that their imagination, ability and vision may be given opportunity to extend knowledge of this method and thus aid the war effort and the economic reconstruction in the peace which is to follow."

Barrett and Hilp, Contractors, San Francisco, California, were awarded the Army and Navy "E" and on December 12, 1942, held an official ceremony for all employees. The award was made for "outstanding performance in wartime construction in the Mare Island Navy Yard."

Chain Belt Company, Milwaukee, Wisconsin, were saddened by sudden death of Frank J. Weschler, vice-president of the firm and general manager of Baldwin-Duckworth, a division of



Chain Belt Company at Springfield and Worcester, Massachusetts. The company announces that A. R. Abelt, secretary of Chain Belt Company was eleteed a director to replace Mr. Weschler. In addition to being made a director of the company, Mr. Abelt was also elected vice-president.

The Cleveland Tractor Company, Cleveland, Ohio, announces the appointment of Wallace L. Cook, to the position of manager of industrial relations. Mr. Cook formerly was with the Carnegie Illinois Steel Corporation where he recently held the position as assistant chief of personnel.

New trade literature

Title: **"Industrial Guard's Manual"**
Subject: The manual is divided into eight chapters dealing with many important phases of the industrial guard's daily work. The first chapter concerns public and worker contact—the guard's job in public relations and his duties as a protector. Other sections of the book emphasize and explain clearly such subjects as riots, panics, mobs, and crowd behavior; self-protection and some methods of dealing with an opponent; first-aid; fire-protection; sabotage; plant protection and bombs. All subjects are discussed clearly and simply and are high-lighted by case histories and actual facts.
Where to Get: National Foremen's Institute, Inc., Deep River, Connecticut. Single copy $1.25.

Title: **"Cletrac Facts"**
Subject: To assist Cletrac dealers in their efforts to "keep 'em rolling," the second issue of Cletrac Facts features five suggestions for maintaining tractors in productive service. According to the publication, certain Cletrac dealers who carry out these suggestions are doing their part in

ARMY E NAVY
• The coveted Army and Navy E Pennant awarded for excellence in production now floats proudly above the Wellman plant.
WILLIAMS Buckets
ARE BITING INTO FROZEN GROUND
and TROPIC MUCK
• Williams Buckets are very much in active service in the wide-flung war offense. Concrete-hard, frozen ground is being broken by the sharp teeth of Williams Buckets in far north road building. Deep in jungles Wellman Buckets are digging and dredging. At ore mines, over stock piles and railway cars, and in steel mills Williams Buckets are literally moving mountains to help beat the Axis.
built by
THE WELLMAN
ENGINEERING COMPANY
7002 Central Avenue • Cleveland, Ohio

securing higher returns for salvaged parts, reducing the non-productive time of worn out and disabled Cletracs, and retaining the services of shop personnel and equipment profitably.

Where to Get: Cleveland Tractor Company, Cleveland, Ohio. Free upon request.

Title: **"Coal Mine Modernization" — 1942 Year Book.**

Subject: Containing the convention proceedings of the 19th annual coal convention at Cincinnati, this book offers valuable notes on discussions held at the meeting. Papers and discussions stress efforts to increase production. One section deals with wartime problems and includes such subjects as espionage and sabotage.

Where to Get: American Mining Congress, Washington, D. C.

Title: **"Rex Spray Nozzles"**

Subject: An illustrated folder describing spray nozzles. Illustrations show various uses which range all the way from cooling fruit in packing plants to washing logs in lumber mills or washing stone on a grading screen. Several applications are described showing the standard sizes of nozzles.

Where to Get: Chain Belt Company, 1600 West Bruce Street, Milwaukee, Wisconsin. Free upon request.

Title: **"Unsung Heroes of War"**

Subject: A 24-page booklet depicting Baker bulldozers, gradebuilders, wagon scrapers, road discs, road rooters, maintainers and snow plows on projects that have been and must be completed before any fighting can be done.

Where to Get: The Baker Manufacturing Company, Springfield, Illinois. Free upon request.

Title: **"Snow—Friend of the Enemy"**

Subject: A 12-page booklet printed in two colors telling of the threat to Victory presented by snowbound pilot training centers and commercial airports, army camps and naval shore establishments and snow-glutted employee parking areas and roads leading to war production plants.

Where to Get: Baker Manufacturing Company, Springfield, Illinois. Free upon request.

POSITIONS WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

Operate any steam or electric dredge or shovel. In good health—over draft limit—no dependents—go anywhere. 40 years experience at stripping, dredging, and construction work. Box 9195

STEAM SHOVEL OPERATOR

Thirty-six year old operator, in good health, desires permanent position on shovel. Married; 4 children school age. Classification 3-A. Have operated 50-B and 70-B steamers, but can learn rapidly and feels confident of operating shovel of any type of power up to 2 yards. Good mechanic. Can make own reairs. Willing to go anywhere in U.S.A. for right connection. Now located near Iron Mountain, Mich. Box 9290

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

TRACTORS, SCRAPERS GRADERS, ETC.

Buckeye Model EH 2-drum hoist with adaptor for International "40" series tractors.

Bucyrus-Erie Model H-44 2-wheeled Scraper. Excellent condition, complete with pump and adaptor for International "14" series tractors. Missouri-Illinois Tractor & Equipment Co., 510 Withers—St. Louis, Missouri.

SMALL SHOVELS, CRANES AND DRAGLINES UP TO 2½ YDS.

MARION MODEL 37 steam shovel crawler mounting, 32' boom also 50' crane boom and clamshell bucket. Steel cab, good condition, central location. Box 2934

LARGE SHOVELS, CRANES AND DRAGLINES 2½ YDS. AND UP

30-B STEAM CRANE with 35' boom. Shovel equipment also. Located Texas. Box 2931

COAL STRIPPING UNIT

200-B BUCYRUS-ERIE steam stripper mounted on caterpillars. 75-ft. boom, 60-ft. sticks, 6-yd. capacity. This machine new 1936. 50-B rebuilt loader, steam power, 30-ft. boom, 22-ft. sticks, 2-yd. bucket. Sell or will lease to financially responsible parties. Box 2910

50-B STEAMER with long boom and 21'6" dipper handles in good operating condition. Boiler completely overhauled recently. Equipped with 1½ yd. Dipper. Located Texas. Box 2929

BUCYRUS-ERIE Class 230 150' boom steam dragline. Wheel trucks. Good working condition. Located Mississippi. Box 2933

Will sell or lease used 5-W Diesel or continuously running main motor electric dragline new in 1935, equipped with 100 foot boom reducible to 80 foot and including 5 yd. dragline bucket. Machine was recently overhauled and painted and is in A-1 mechanical condition. Western location. Box 2938

STRIPPER AND LOADER

225-B BUCYRUS-ERIE steam stripper truck mounted, in excellent condition. 80-ft. boom, 54-ft. sticks, 6 or 8 yd. bucket. 50-B rebuilt 2-yd. loader. Extra parts for both machines. Sell or lease to responsible parties. Box 2911

CLASS 14 electric dragline with 100' boom, 2 yd. bucket, 2300 volts, 60 cycles, 3 phase. In good working condition; operating every day. Located Texas. box 2930

320-B steam shovel truck wheel mounted 85 foot boom 54 foot handle 7½ yard dipper, reasonably priced, immediately available, location midwest. Box 2936

THREE MARION MODEL 125 3 yard electric shovels in A-1 condition. Suitable for power supply of 3 phase 60 cycle 2300 volts and 3 phase 60 cycle 4000 volts. General Electric equipment. Located Minnesota. Box 2935

MISCELLANEOUS EQUIPT.

LOCOMOTIVE

40-TON VULCAN Saddle Tank Locomotive. Standard gauge. A.S.M.E. boiler good for 190 lbs. Rebuilt and ready to go.

MACKINTOSH ENGINEERING CO. 2907 Library Avenue, Cleveland, Ohio.

DRAGLINE BUCKETS AVAILABLE FOR IMMEDIATE DELIVERY

1—⅝ cu. yd. Type AU Beco 1250 lbs.
6—¾ cu. yd. Type AU Beco 1500 lbs.
5—1 cu. yd. Type AU Beco 1850 lbs.
4—1¼ cu. yd. Type AU Beco 2250 lbs.
4—1½ cu. yd. Type AU Beco 2500 lbs.
3—1¾ cu. yd. Type AU Beco 3100 lbs.
6—2 cu. yd. Type AU Beco 3500 lbs.
1—2¼ cu. yd. Type AU Beco 4000 lbs.
1—2½ cu. yd. Type AU Beco 4250 lbs.
1—4 cu. yd. Type AU Beco 6850 lbs.
1—4 cu. yd. Type Y Special 11,500 lbs.
1—7 cu. yd. Type W Monighan 13,700 lbs.

BUCYRUS-ERIE COMPANY
Parts Dept. South Milwaukee, Wis.

STEEL HULL DIPPER DREDGE

One and one-half yard Diesel Electric Equipped with Fairbanks-Morse full diesel Engine and Generator. All electric hoist swing and spuds. This machine has had only a few months use and hull and machinery are like new. Cash or terms to responsible buyer.

Bryan and Holloway Inc., Belle Glade, Fla.

Dragline bucket, 1¼ cu. yd., P&H, new. Crushing plant, Iowa, jaws 12"x24", rolls 16"x24".

Trailer, heavy-duty, 12-ton LaCrosse, like new.

Martin County Nat'l. Bank, Fairmont, Minn.

SHOVEL EQUIPMENT FOR 52-B

27'6" boom, 18' dipper handle, 2¼ yd. rock type dipper. Also auxiliaries for 52-B diesel shovel service. Used less than 6 months. Box 2920

NEW ENGINES FOR SALE

1—Hercules First Altitude Gas Engine—Model "WXC-3"—6 cylinders—4¼" bore x 4½" stroke—75 H.P. @ 1575 R.P.M. idling speed.

4—Hercules Second Altitude Gas Engine—Model "WCX-3"—6 cylinders—4¼" bore x 4½" stroke—75 H.P. @ 1575 R.P.M. idling speed.

4—Wisconsin Gasoline Engine—Model "M-4-A"—6 cylinders—5¼" bore x 6" stroke—117 H.P. @ 1230 R.P.M. idling speed.

Further information will be gladly furnished upon request.

Write — Telephone — Wire
Parts Department
Bucyrus-Erie Company
South Milwaukee, Wisconsin

4-TRACK TIPPLE

Complete 4-track coal tipple and siding, 40-car per day capacity. Bargain. Box 2912

Car Transporter

STACKER TYPE MACHINE consisting of self-propelled caterpillar mounted, inclined bridge on which 3-cubic yard material transporting car travels and dumps automatically at a distance approximately 145' horizontally and 80' vertically from loading point. Machine in good condition and priced to sell. Operates on 60-cycle, 3-phase, 2300 volts. Further information on request. Box 2918

KEYSTONE blast-hole drill, Model 71, crawler mounted. Excellent condition. Immediate possession. Morgan Coal Co., 19 West 38th Street. Indianapolis, Ind.

LIGHTING PLANTS

FAIRBANKS-MORSE light plants, two only, new, Model "A," 750 watt, 115 volt. Compound wound, direct current generator, driven by V-belt from single cylinder gas engine complete with special tank and hillside sump filler cup. Price: Net cash, F.O.B. Erie, Penn., $175.00 each.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee, Wis.

5-YARD PAGE rock bucket weighing about 14,000 lbs. and in very good condition, also have 100 extra tooth points. Reasonably priced. Available immediately. Box 2921

WORK FOR DRAGLINE
BUSINESS OPPORTUNITY

A good proposition available to a party with 6 to 10 yard, 125 ft. boom dragline. Replies respectfully solicited. Box 2924

Brownhoist 20-ton locomotive crane, steam, std. ga., 8-wheel, 49' boom, ASME boiler, MCB, being completely rebuilt, ship Feb.

Bucyrus-Erie 1¼-yd. GA-2 gas-air shovel.

Bucyrus 80-B high lift steam shovel, on cats.

Locomotives, gasoline, narrow 36" & 30" gauge, 7 & 8 tons. Four steamers, 36" ga., 18-ton.

Allis-Chalmers 18" Gates No. 8K gyratory crusher, manganese fitted, No. 5405, Tex-rope; A-1.

Monighan 3T Walker dragline, elec., 70' boom.

1000 HP hydro-electric plant, 60' head, A.C.

Fish tug, steam, steel, 61'x15'x8', A-1.

H. Y. SMITH CO.
828 N. Broadway Milwaukee, Wis.

STEEL DERRICK

Clyde, Steel, Stiff Leg Derrick, 80' boom, 40' mast, 16' bull-wheel. 3 line for clam-shell. 10-30 tons; very good condition.

J. H. Berkebile & Sons
Toledo, Ohio

BUCYRUS-ERIE 17-B Shovel equipment. Practically new. Will also fit 19-B. Located Texas. Box 2919

ARMSTRONG 50-BE electric blast hole drill, 3 phase, 60 cycle, 440 volt, steel frame, wheel mounted, self-propelling. Steel derrick with shock absorber for wire line. Good operating condition. Price without tools $1200.00 cash, F.O.B. Central Tennessee. Box 2928

DIPPERS

⅝ cu. yd.—10-B—Drag shovel dipper
½ cu. yd.—16-B—Drag shovel dipper
½ cu. yd—18-B—Skimmer scoop dipper
¾ cu. yd.—20-B—Shovel dipper
¾ cu. yd.—20-B—Drag shovel dipper
1¼ cu. yd.—33-B—Shovel dipper
1¼ cu. yd.—GA-3—Shovel dipper
1¼ cu. yd.—(41-B / 42-B / E-2)—Shovel dipper
1½ cu. yd.—(41-B / 42-B / E-2)—Shovel dipper
2 cu. yd.—75-B—Shovel dipper
2¼ cu. yd.—50-B—Shovel dipper
2¼ cu. yd.—75-B—Shovel dipper
3½ cu. yd.—75-B—Coal dipper
5 cu. yd.—120-B—Shovel dipper (used)
6 cu. yd.—(200-B / 225-B / 320-B)—Shovel dipper
8 cu. yd.—320-B—Shovel dipper (used)

"FOR BUCYRUS-ERIE EXCAVATORS ONLY."

PARTS DEPARTMENT
Bucyrus-Erie Company
South Milwaukee, Wis.

P&H Model 300 Crane with ½ yd. Clamshell. Good operating cond. 35 ft. boom $2750. Telsmith Gyratory Crusher good cond. $325. 6x6 Swaby Gravel Pump, no power, $60. Parson Model 20 Backfiller, $350. Good for small loading crane. Box 2942

FOR SALE

One Keystone ½ yd. backhoe, 3 bulldozer blades will fit RD 7, D8-D4; parts for 40 & 55 Cletrac tractors; 5 comp hydraulic dumps, 1 yd. clamshell bucket, 3 Euclid 1½ yd. scrapers good condition. $150 each. Sol, 95 Flat Shoal Ave., Atlanta, Georgia.

ROCK DIPPER BARGAIN

2 yard dipper with new front, new bail lugs, new side plates, and is in A1 condition. This is a heavy rock dipper complete with bail but without bail pins or tooth bases. Box 2932

SURPLUS MINE EQUIPMENT
BARGAIN PRICES

Write for prices of this equipment. Save money. Located in Minnesota.

1—Motor, 135 H.P. squirrel cage, 1150 r.p.m., 220 v., 3 ph., 60 cy., A. C.; compensator.

3—Rotary converters, 300 Kw., HCC-6-800-1200. Forms P, D, & V, 6 and 8 phase.

1—Switchgear for 3-phase rotary converter, complete, semi-automatic.

3—Transformers, 300 Kw., 66,000 V. Primary, reconnected for 22,000 V. Primary.

1—Ainley placer gold machine, complete. 1-bowl with feed hopper for dragline operation. 40-50 tons per hour.

3—Pumps, steam (1 gas engine driven) from 49 to 3700 g.p.m.

Box 2917

1—Combination Clamshell Crane Model 206 P&H ¾ yd. capacity 40 ft. Boom —$2,500
1—Shovel Model 32B Bucyrus-Erie 1 cu. yd. capacity gasoline powered—$11,750
1—Locomotive Plymouth 8 Ton 36 inch gauge type MA gasoline powered—$1,950
1—Trailbuilder LaPlant Choate for D8 Caterpillar Tractor—$1,000
2—Double Drum Sheepsfoot Rollers, Each—$785
1—Concrete Paver Model 27E Koehring —$1,995
2—Shovels Osgood 1¼ cu. yd. capacity gasoline powered, Each—$7,950
1—Generator Set 45 KW 3 ph. 60 cy. direct connected to new 6-cyl. Buda gasoline engine all on steel channel base—$2,496
1—Shovel Front Osgood 1 cu. yd. capacity—$750
1—Blacktop Paver Adnun powered by gasoline engine—$3,795
1—Compressor Portable Ingersoll-Rand 310 cu. ft. 4 steel wheels—$1,650
3—Pull Type Graders, 12 foot, 10 foot, 8 foot, priced right.

ROY-C-WHAYNE
SUPPLY COMPANY
LOUISVILLE, KENTUCKY

Set of Athey 15-ton and set of 30-ton track wheels, complete. Give wheel base (distance center to center of idlers), dia. of idlers, width of tracks, & size of hole for axle in yoke.

Also 3 to 15 KW diesel or gas portable lighting plants, 115V or 230V DC, 110V or 220V single phase or three phase AC. Advertiser acting for Defense Plant Corp., Penna. Box 2940

FAIRLEAD WANTED

Dragline fairlead for Koehring 301. Write Willy Boutin, 3281 Mont Joli St., Montreal North, Quebec, Canada.

Shovel equipment for 50-B diesel draglines. Write complete description including price. Box 2922

Trench Hoe attachment for Bucyrus-Erie 1030. Please give price and full particulars. Box 2926

---

20 ft. right and left hand dipper sticks for Bucyrus-Erie 100-B shovel. Also 23 ft. dipper handle for Marion 4120 shovel. Advise price, location and condition. Box 2939

Trenching machine for use in laying tile drainage system. By a South Carolina Conservation District. Give full particulars in first letter, please. Box 2941

WANTED

Late Model Caterpillar Tractor with High-lift Shovel Attachment.

Egyptian Cont. Co., Herrin, Illinois

One T-40 International tractor transmission housing. Sol, 95 Flat Shoal Ave., Atlanta, Georgia.